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COMMERCIAL FISHERIES REVIEW

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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor

Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

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5/31/63

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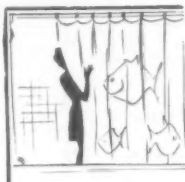
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ORIGIN OF MAINE SARDINE CANNING INDUSTRY

"Sardines were first packed at Nantes, France, in 1834, and by 1860 a fairly good market had been created for French sardines in this country. Efforts were made to establish an American industry in 1871, utilizing young menhaden as raw material. In 1877 Julius Wolff began canning small herring at Eastport, Me., and is credited with starting the first really successful American sardine cannery. In a few years a large number of sardine canners were operating in northern Maine and nearby Canada."

--"Principles and Methods in the Canning of Fishery Products,"
Research Report No. 7 (page 3),
U. S. Fish and Wildlife Service.

Editorial Assistant--Ruth V. Keefe

Compositors--Jean Zalevsky, Alma Greene, Helen Paretti, and Raie Carron

* * * * *

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COMMERCIAL FISHERIES REVIEW

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SNAPPER TRAWLING EXPLORATIONS ALONG THE SOUTHEASTERN COAST OF THE UNITED STATES

By Robert Cummins, Jr.,* Joaquim B. Rivers,* and Paul Struhsaker*

SUMMARY

Concentrations of food fish along the southeastern coast of the United States have been discovered by U. S. Bureau of Commercial Fisheries exploratory fishing with the chartered trawler Silver Bay. Catches, during the explorations, ranged up to 2,000 pounds of snapper, grouper, and ecologically-related species having average landed values of 15 to 23 cents a pound. Best catches were made on "live bottom" off St. Augustine, Fla., and SSE. of Cape Fear, off the Carolinas. Careful attention to depth-recorder fish traces and use of a funnel flapper in the roller-rigged trawls were major factors in the success of the explorations.

INTRODUCTION

Exploratory fishing has revealed commercial concentrations of food fish in selected areas along the south Atlantic coast of the United States. Because of the interest shown in this potential fishery, the following report has been prepared to provide preliminary information on trawl-caught snapper, grouper, and ecologically-related species. The information is preliminary in that explorations on a regional and seasonal basis are incomplete. Data obtained on cruises of the trawler Silver Bay, a vessel chartered for fishery explorations by the U. S. Bureau of Commercial Fisheries, form the basis of the report.

AREA OF EXPLORATIONS

Exploratory fishing with roller-rigged fish trawls was conducted over the continental shelf in 15 to 70 fathoms between Ft. Pierce, Fla., and Cape Hatteras, N. C. Most coverage was obtained in 15 to 30 fathoms where the bottom varied from smooth to broken, but where trawling with roller-rigged trawls was generally possible. Limited coverage was given the 30- to 70-fathom range.

From 15 to 70 fathoms between Cape Lookout and Cape Canaveral, "live bottom" areas were found where food fish were caught with bottom trawls in varying amounts. "Live bottom" is composed, typically, of the following animals and inert materials.

Loggerhead sponge	- generally present, small to very large amounts
Fire sponge	- generally present, variable amounts
Other sponge	- always present, small amounts
Coral	- occasionally present, small amounts
Rock	- sometimes present, variable amounts
Shell	- usually present, small amounts

The area beyond 70 fathoms adjacent to the Gulf Stream was not explored with fish trawls, and the extent of the resources in deep water is, therefore, unknown.

*Fishery Methods and Equipment Specialists, Exploratory Fishing and Gear Research Station, U. S. Bureau of Commercial Fisheries, Brunswick, Ga.

During exploratory fishing trials, the best catches were invariably made on "live bottom" when fish tracings appeared on a whiteline depth-recorder. Characteristically, the catches possessed a strong, warmly pungent odor associated with the "live bottom."

Off St. Augustine, Fla., and SSE. of Cape Fear, S. C., good catches were made consistently on "live bottom" at different seasons during several Silver Bay cruises (fig. 1). Cov-

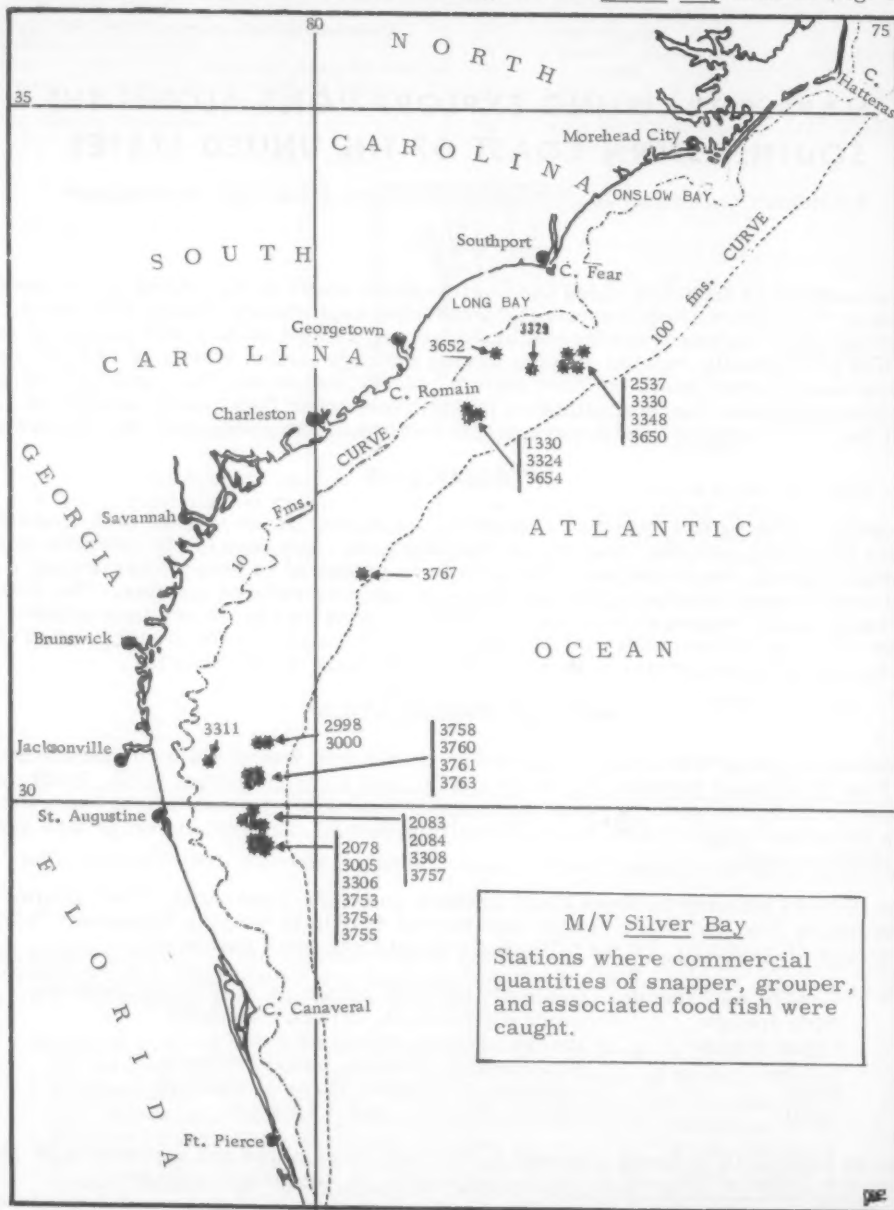


Fig. 1 - Chart of southeastern coastal waters explored for snapper and related food fishes, October 1959-March 1962.

erage by the Silver Bay has not been sufficiently extensive, to date, to delineate in detail "live bottom" areas suitable for bottom trawling.

FISHING RESULTS

FOOD FISH: The species here referred to as snapper, grouper, and ecologically-related food fish, which constituted the most valuable portion of the catches, are listed and grouped in the order of their approximate value in table 1.

Table 1 - Snapper, Grouper, and Ecologically-Related Food Fish Taken Commonly in Silver Bay Trawl Catches

Common Name	Scientific Name
Vermilion snapper	<u>Rhomboplites aurorubens</u>
Yellowtail snapper	<u>Ocyurus chrysurus</u>
Red snapper	<u>Lutjanus blackfordii</u>
Mutton snapper	<u>Lutjanus analis</u>
Gray snapper	<u>Lutjanus griseus</u>
Silk snapper	<u>Lutjanus vivanus</u>
Hogfish	<u>Lachnolaimus maximus</u>
Black sea bass	<u>Centropristes striatus</u>
Black grouper	<u>Mycteroperca bonaci</u>
Red grouper	<u>Epinephelus morio</u>
Groupers (miscellaneous)	<u>Mycteroperca</u> sp. and <u>Epinephelus</u> sp.
Scamps	<u>Mycteroperca phenax</u> and <u>M. interstitialis</u>
Red porgy	<u>Pagrus sedecim</u>
White porgies	<u>Calamus</u> sp. (2 species taken commonly)
Porgies (miscellaneous)	<u>Stenotomus</u> sp.
Grunts	<u>Haemulon aulineatum</u> and <u>Haemulon plumieri</u>
Triggerfish	<u>Balistes capricus</u>

Note: Listed in order of apparent local commercial potential.

VERMILION SNAPPER: This fish was found throughout the area and is the most valuable species taken in commercial quantities.

Silver Bay trawling resulted in salable catches of up to 1,000 pounds per drag, and the fish were sold for as high as 35 cents a pound. Some catches contained many small individuals, but for the most part, the average size was about 2 pounds. Like red snapper, vermillion snapper are bright red in color, and the meat is light and mild. They normally demand a higher price than red snapper on the East coast. The fish are easily captured in fish trawls, but the use of a "funnel flapper" (fig. 2) is recommended to prevent their escapement.

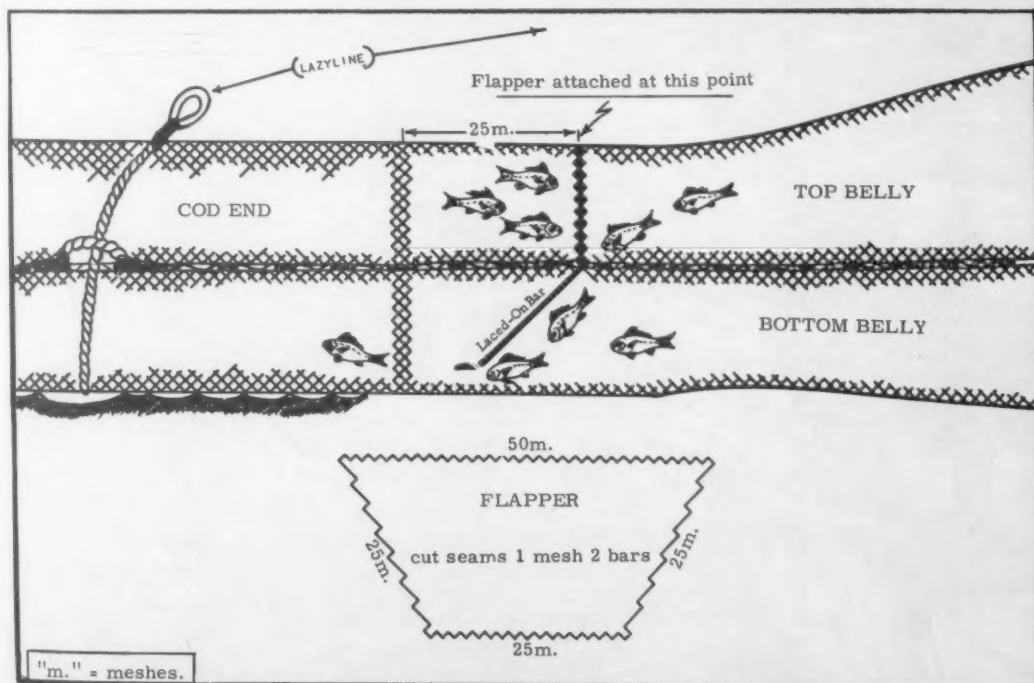


Fig. 2 - Cutting diagram and detail of arrangement of the funnel flapper. The flapper helps prevent fish from swimming out of the trawl.

OTHER SNAPPER: Other species of snapper, and hogfish, were usually present. A greater number of species per drag was present off Florida than farther north. Seldom did a drag produce more than about 200 pounds of a single snapper other than vermilion snapper, but collectively, the miscellaneous snappers comprise a group next in value to vermilion snapper.

BLACK SEA BASS: Sea bass were not taken in amounts exceeding 200 pounds per drag. Normally they command a good price, and they are easily handled. With additional coverage of areas and seasons, it is possible that this species will be found in greater quantities.

GROUPE: Numerous catches contained several 30- to 40-pound grouper. Grouper contributed significantly to the catches and were sold for about 10 cents a pound.

ASSOCIATED SPECIES: The remaining food fish were scup or porgy (at least three species), triggerfish, and grunt. The latter were occasionally taken in commercial quantity, but were usually of a size smaller than is normally marketed. They are mentioned here because the size taken is sometimes marketed in quantity in other sections of the Atlantic seaboard.



Fig. 3 - Catch of groupers, porgies, triggerfish, and associated species of food fish aboard the Silver Bay.

Triggerfish were quite common in the catches and ranged in amounts up to about 600 pounds per drag. The species is salable locally and when filleted is marketed as turbot steak.

The three species of scup or porgy often comprised the bulk of salable fish. They are referred to commercially as red porgy, small white porgy, and large white porgy. All brought the same price--about 8 cents a pound--and catches of salable fish ranged up to more than 1,000 pounds per drag.

VALUE: During two cruises, test landings were made to determine the approximate value of the catches. In order to determine an average value, the salable fish were sorted, iced down in the hold,^{1/} landed, and sold in the approximate same proportions as they occurred in the catch. The value per pound was found to average 23 cents in May 1961 (Silver Bay Cruise 30) and 15 cents in February 1962 (Silver Bay Cruise 37).

FISHING METHODS

During initial exploratory fishing trials, routine transects were made over a broad area. Fishing sets were made "in the blind" and at locations when fish tracings occurred on the whiteline depth-recorder. It was found that catches of snapper, grouper, and ecologically-related species were invariably made when fish tracings occurred on and near bottom. From this information the following procedure was developed, which became standard practice on Silver Bay cruises.

With the whiteline recorder on, transects were made in areas likely to contain broken or irregular bottom. When bottom fish tracings were observed, a buoy, maintained "at the ready" was immediately set out to mark the exact location. So long as the recorder was set for the speed of the vessel, transects could be effectively made at any speed. Generally, when wide coverage was desired, as when searching for broken bottom areas, transects were made at full speed. When less coverage and greater detail on the recorder was desired, as when searching for fish tracings over broken bottom areas, transects were made at reduced speed. Once the buoy was set out, the surrounding area was "cartwheeled" or worked out in all directions to determine the location, size, and number of fish concentrations and the bottom contour. Finally, on the basis of recorder tracings of fish and bottom contour, the actual fishing operation was begun.

During earlier cruises, as an aid in determining the size and species being recorded, hand-line fishing over tracings of fish was occasionally performed prior to "shooting" the trawl. With experience, however, fish tracings on and near bottom could be accurately interpreted, as evidenced by the fact that it was possible to make good catches of the sought-after food fish solely on the basis of the recorder tracings.

GEAR USED

The Silver Bay, the gear used in snapper explorations, and the exploratory snapper fishing operation have been described previously (Captiva and Rivers 1960).

A wide variety of gear, including roller-rigged fish trawls varying from 50/70-foot to 86/116-foot and 40-foot industrial fish and shrimp trawls, was used in early explorations. But the principal gear used in most of the explorations was either 50/70 or 80/100-foot roller-rigged trawls with 8- to 10-foot bracket doors. These trawls were hung, rigged, and fished in the usual way (Knake 1956, 1958), except that funnel flappers (fig. 2) similar to those used by some New England fishermen were added. The funnel flappers proved to be useful accessories in preventing the escape of fish from the cod ends. Their use is recommended when the object of trawling is large fish such as snapper and grouper.

^{1/}Snapper (except small vermilion snapper), grouper, scamp, and hogfish were rough dressed prior to icing; all other fish were iced in the round.

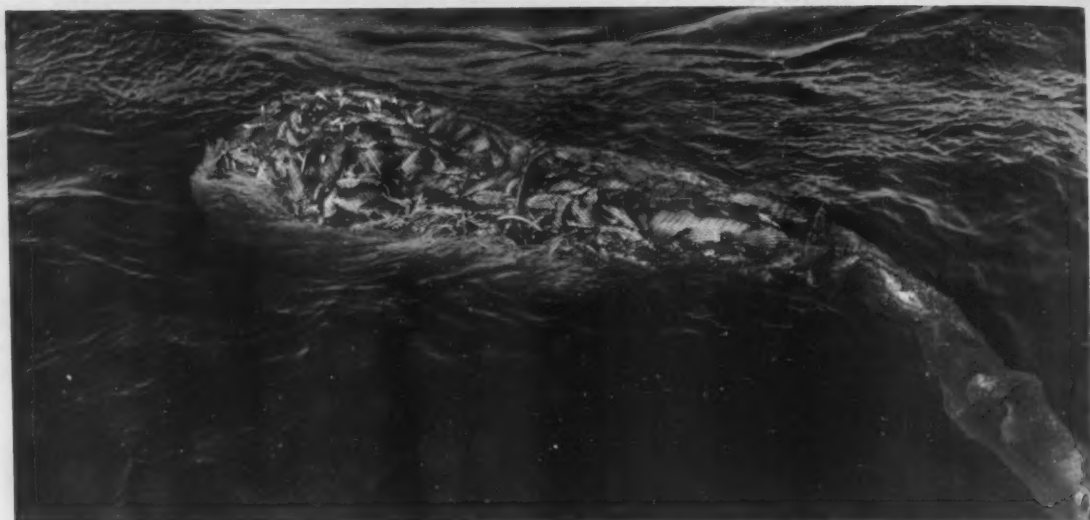


Fig. 4 - A fine catch of fish (mostly snappers and groupers) floating in the cod end before pick up by the Silver Bay.



Fig. 5 - Bringing the roller-rigged fish trawl aboard the Silver Bay at the end of a drag. The tree-trunk rollers make possible trawling on broken bottom.



Fig. 6 - Cod end of fish trawl coming aboard the Silver Bay.

APPENDIX

A detailed fishing log showing fishing positions, gear, minutes fished, and other pertinent data for each drag is available as an appendix to this report. Write for Separate No. 661 which contains Table 2--Fishing Log, Silver Bay Snapper Trawl Stations, 1959-62.

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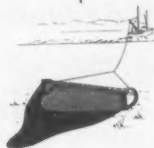
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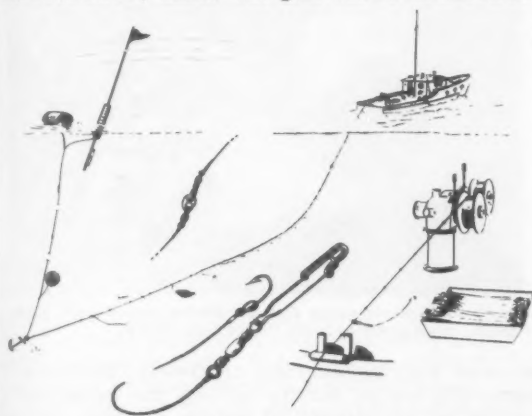
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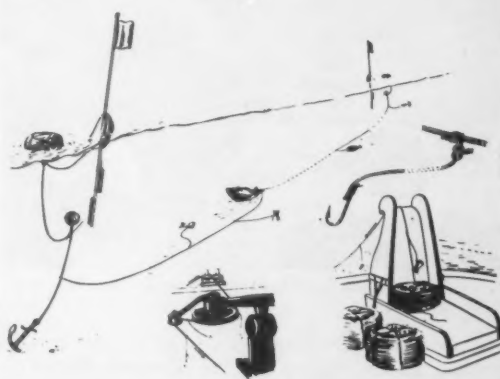


LONGLINE OR SETLINE, WITH HOOKS

This type of gear is an extremely long fishing line with a series of baited hooks on short, separate, but attached, lines. The gear can be anchored or left drifting and requires only periodical attention.



Steel cable longline



Halibut longline

The longline is known as a "trawl line" in New England, a "setline" on the Pacific Coast, and as a "trotline" in the South and inland waters. Although this type of fishing method was once important in the New England fisheries, it has been supplemented during the past twenty years by the otter trawl. However, in the halibut fisheries off the Northwest Coast of the United States this form of fishing continues.

Note: Excerpt from Circular 109, Commercial Fishing Gear of the United States, for sale from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., single copy, 40 cents.

THE UNITED STATES FISHING INDUSTRY AND THE EUROPEAN COMMON MARKET

By Harold E. Crowther* and Arthur M. Sandberg**

INTRODUCTION

The United States fishing industry has important issues at stake in the developing European Economic Community, otherwise known as the Common Market. Gradual application of Community regulations is already having its effect on world trade in fishery products. The full impact of the Common Market is expected by 1970, possibly sooner.

GROWTH BY ECONOMIC UNION

Six countries--France, West Germany, Italy, and the Benelux countries (Belgium, Netherlands, and Luxembourg)--make up the Common Market. Historically, these countries have not seen eye to eye on many problems, including those concerned with trade and tariff matters. Each has operated as an individual nation, separated from its neighbors by trade walls. But changes have occurred in recent years--changes which will affect the world; United States trade will be affected. The six European countries have formed a Common Market, which is essentially a marketing arrangement to remove trade barriers between the member countries and to establish a common external tariff.



Fig. 1 - Six nations have formed an economic union known as the Common Market.



Fig. 2 - Commerce among Common Market countries will flow freely, much as it does in the United States today.

Eventually commerce within the combined area will be carried on freely, much as it is among the States of the United States. There will be no tariffs among the countries making up this customs union, and no restrictions on movement of goods, capital, services, and workers. Like the United States, the Common Market will have a single policy on imports from "outside" countries.

Shortly after World War II, a drive for European unification began as a means of overcoming political and economic problems. In 1947, the United States fostered the Marshall Plan which laid the groundwork for European recovery and cooperation. The Organization

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Note: Adapted from a report ("Problems of the Common Market") delivered at the 21st Annual Meeting of the Atlantic States Marine Fisheries Commission, September 26, 1962.

U. S. Bureau of Commercial Fisheries, Washington, D. C.

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for European Economic Cooperation, set up in 1948, was followed by creation of the Benelux Customs Union. Later came the European Coal and Steel Community, and the European Atomic Energy Community. In March 1957, the Treaty of Rome set up the framework for the Common Market and started Western Europe on a new page in her history.

Many people say that the European Common Market is the most significant economic development of this century. It is only four years old and already astonishingly successful in establishing European unity where total disagreement existed before. From the Marshall Plan onward, the United States has consistently encouraged economic and political cooperation in Western Europe within the framework of a liberal trade policy for it sees in the rise of a unified, prosperous Western Europe a vast increase in the strength of the Free World at a time when strength is urgently needed.

COMMON MARKET BENEFITS

In area, the Common Market is relatively small but its population of 170 millions is close to that of the United States today. Furthermore, the Common Market is one of the most intensively industrialized areas of the world.

There is every indication that the Common Market is succeeding beyond normal expectations; tariffs between member countries have already been cut substantially on many products, and in a few years they will be eliminated entirely. The economic growth rate of the Common Market has been accelerating. Industrial goods are flowing freely and virtually all workers are employed. High purchasing power and availability of goods have stimulated buying, and exports and imports have increased. Other countries in Europe foresee considerable advantages in membership in the Common Market, as well as certain trade problems that they would face if they did not become members.

OTHER COUNTRIES SEEK ENTRY

The leading fishing nations of Western Europe--the United Kingdom, Norway, and Denmark--are now seeking entry into this economic union. The total annual output of fish by those three countries has been 3.2 million metric tons. The Common Market countries produce about 1.9 million tons. Iceland has not sought membership but statements from officials of that country indicate an awareness of possible difficulties, if the United Kingdom, Norway, and Denmark are accepted into the Common Market. In view of its heavy dependence on fisheries, Iceland may seek some type of association that would permit its fishery products free access to the Common Market.

With these additional countries as members, the Common Market would encompass a trading area of about 250 million people--

EEC-U.S. COMPARISON OF SIZE

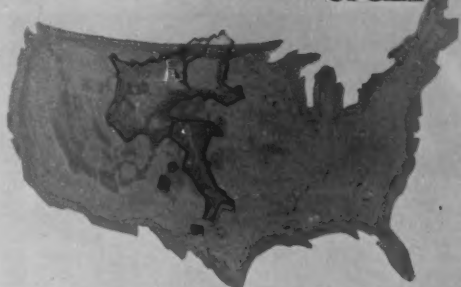


Fig. 3 - In area, France and West Germany are both smaller than Texas; Belgium is about the size of Maryland; the Netherlands is larger than Massachusetts; and Italy is the size of New Mexico.

COUNTRIES SEEKING MEMBERSHIP



Fig. 4 - Leading fishing nations of Europe now seek entry into Common Market.

larger than the United States. The enlarged Common Market will be the biggest trading area in the world, creating a greater marketing challenge.

Conditions under which new countries would be permitted entry into the Common Market are now being negotiated and we are watching the outcome carefully. The United Kingdom, second only to the United States as an importer of fishery products, is also a leading fish-producing country. As a member of the Common Market, the United Kingdom would accept the Market's tariff system and adopt uniform fishery policies, but in doing so it may abolish preferential tariffs on goods from Canada, New Zealand, and Australia. The Commonwealth countries are concerned that they will lose profitable trade in the United Kingdom market should the United Kingdom enter the Common Market.

The Common Market thus already consists of an important and collectively powerful group of countries and promises to be enlarged even further in the relatively near future. Greece has concluded an agreement for association with the Common Market providing for full economic integration but over a longer period than for the present members. Other countries, such as Sweden, Austria, and Switzerland, are seeking more limited relationships with the Common Market.

COMMON TARIFFS INCREASE SOME RATES

The duties for fishery products entering Common Market countries will change substantially in the next several years. In setting up a single "average" common tariff on imports

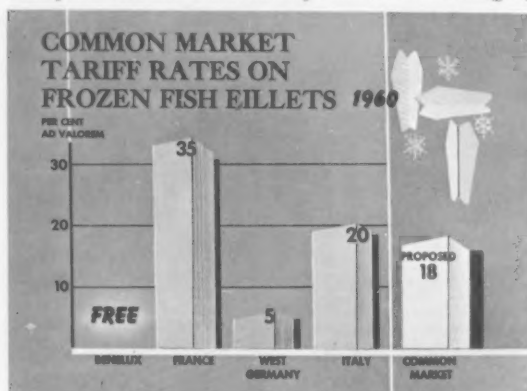


Fig. 5 - In the Common Market, present national duties on fillets will gradually adjust to a uniform level by 1970.

of products from outside the Common Market, it was proposed in 1958 that the new external duties become effective gradually over a period of about 12 years, or by 1970. As an example of the tariff changes resulting from the adoption of a common tariff, let us take the case of fish fillets. The original rate of duty on frozen fish fillets was 5 percent in West Germany, free in the Benelux countries, 35 percent in France, and 20 percent in Italy. The proposed common external tariff of the Common Market is 18 percent ad valorem. Thus, the French and Italian duties will be lowered, but the West German and Benelux rates will be increased. The proposed duty will be substantially higher in the countries that have been importing the bulk of the fish fillets.

On the positive side, however, we might expect the adverse effect of higher duties in

Table 1 - European 1958 National Duties and Eventual Common Market External Tariffs for Certain Fishery Commodities of Interest to United States

Product	Benelux	France	West Germany	Italy	Common External Tariff ^{1/}
	(Percent)				
Frozen:					
Fillets	Free	35	5	20	18
Tuna	Free	33	Free	18 (limited duty-free quota)	25 (with limited duty-free quota)
Shrimp	Free	10-30	35	18	18
Salmon	Free	10	3-12	20	10
Byproducts:					
Fish oil	Free	16	0-5	Free	Free
Fish meal	Free	15	Free	9	4
Canned:					
Salmon	Free	20	20	14	16
Tuna	20	25	20	40	25
Pilchards	20	25	20	30	20
Shrimp	25	35	40	10	20
Crab meat	25	10	30	10	20
Oysters	25	10	35	20	20

^{1/} These rates are expected to be achieved in a series of steps by 1970 according to plan.

West Germany and Benelux to be counterbalanced somewhat because France and Italy, with traditionally high tariffs, would import more fishery products under the new "average" common tariff level. The 10-percent duty on United States fish oil in the United Kingdom might also be reduced to the duty-free level of the Common Market. Also, higher consumer income in the Common Market may have beneficial effects on total trade.

For certain fishery commodities of interest to the United States, the 1958 national duties and the eventual Common Market external tariffs are shown in table 1.

EFFECT ON TRADE WITH UNITED STATES

With higher duty rates in major markets, we may anticipate that normal trade patterns in the Common Market countries will undergo considerable change in the next few years. Most of the Common Market import duties for fishery products will be considerably higher than those of the United States. As those duties change, Iceland and Norway may find it advantageous to seek additional markets in the United States. On January 1, 1962, in the first step toward the Common Market tariff, the Benelux duty on fish fillets increased from 0 to 5 percent; eventually this will be tripled. West German rates also increased. Those countries are important buyers of fillets from Northern European countries.



Fig. 6 - A common fisheries policy will be formulated during 1963.

Should the United Kingdom succeed, as anticipated, in joining the Common Market, its duty level which is now relatively low on most fish products, would gradually increase to the higher level of the common tariff. It is expected that Denmark and Norway would follow the United Kingdom into the Common Market. When those three important fish-producing countries join, their products will move freely within the Community and countries on the outside will have increased difficulties in surmounting the tariff barriers.

A comparison of the present United States import duties and the common external tariff of the Common Market for selected fishery products is shown in table 2.

COMMON FISHERIES POLICY

Next year, basic decisions are to be made in formulating a common fisheries policy. At this time, it is too early to know what special marketing or support devices may be used to stimulate fishery development in the Common Market. We might take heed from the agricultural policy decisions made in January 1962; the main features of the proposals thus far advanced include control of farm products through common marketing authorities, establish-

Table 2 - Comparison of Present United States Import Duties and the Common Market External Tariff for Selected Fishery Products

Product	Rate of Duty	
	United States	Common Market ^{2/}
		(Percent)
Groundfish fillets	About 9.5 ^{1/}	18
Fillet blocks or slabs . .	About 4 ^{1/}	15
Fish sticks and portions .	20 and 30	20
Fresh or Frozen:		
Tuna	Free	25 (with limited duty-free quota)
Shrimp	Free	18
Salmon	About 1 ^{1/}	10
Halibut	About 2 ^{1/}	15
Canned:		
Tuna	12 ^{1/2} and 35	25
Salmon	15	16
Pilchards	6 ^{1/2}	20
Crab meat	22 ^{1/2}	20
Oysters	About 18.5 ^{1/}	20
Shrimp	Free	20
Byproducts:		
Fish meal	Free	4
Fish solubles	Free	9
Fish oil	Various rates	Free

^{1/}Ad valorem equivalent.

^{2/}Rates will gradually rise to this level in steps, and will be fully achieved by 1970, possibly sooner.



Fig. 7 - Increased Common Market import duties may divert present trade to other countries.

ment of common prices, equalization of prices on imports through a system of variable levies, and in some cases quantitative restrictions on imports.

PREDICTIONS

In the near future, we might expect the following developments from the Common Market:

(1) Members will formulate a common fisheries policy that will permit freer movement of labor and capital, and provide for the establishment of community-wide fishing and landing privileges in all member countries.

(2) Under a uniform fisheries policy, there will be better control of fishery resources and more economical production.

(3) In filling the demands of this great market, processing and marketing organizations of the Common Market will become larger and financially stronger. These concerns will become formidable competitors not only in their own markets but also in the export field.

(4) Fishing fleets, now subsidized in varying degrees, would be integrated and strengthened; larger, more efficient vessels would extend their fishing operations to more productive grounds in other parts of the world.

(5) There will be greater competition from the Common Market for fishery products now exported from Northern Europe to the United States.

NEGOTIATIONS UNDER TRADE EXPANSION ACT OF 1962

President Kennedy has asked for, and the Congress has granted him, broad new authority to negotiate trade agreements with the Common Market and other countries. In this effort, he could make reductions in United States import duties in exchange for reductions in tariffs of the Common Market. Known as the "Trade Expansion Act of 1962" (P. L. 87-794), this legislation provides that the President may lower existing duties by 50 percent, and eliminate tariffs on certain products now dutiable at 5 percent or less and on products for which the United States and the Common Market account for 80 percent or more, by value, of world exports. The effects of this program could mean increased competition for some United States-produced fishery products and increased opportunities for others. Because it has been recognized that some United States industries might be hurt by lower duties and increasing imports, a system of Federal "adjustment assistance" has been established to aid United States companies and workers injured by imports. Under this phase of the program, United States enterprises idled by increased imports may be assisted in meeting import competition and making economic adjustments primarily through a program of tax relief, loans, and technical assistance for modernization and diversification of operations. Readjustment allowances would be given to workers idled by imports.

OTHER REGIONAL ECONOMIC UNIONS FORMING

The European Common Market is already well on its way. Two economic units are now developing in Latin America. The larger of the two is known as the Latin American Free Trade Association (LAFTA), and consists of Mexico, Colombia, Ecuador, Peru, Chile, Brazil, Paraguay, Uruguay, and Argentina. The other group is called the Central American Common Market, the members of which are Guatemala, El Salvador, Honduras, and Nicaragua. In the near future, those also may have an important impact upon our fisheries.



Fig. 8 - Latin American nations are forming a free trade association.



Fig. 9 - A Central American Common Market is also developing.

MEETING THE CHALLENGE

Now, what can we do to make the challenge of the new markets an opportunity for domestic growth and development?

First, we can work to improve our fishery productivity, efficiency, and cost position.

Second, we can step up our research and development activities, transforming the increased scientific knowledge into new processes and products. Products which are unique or better than those of our competitors will gain and hold new markets abroad as well as at home.

Third, we can apply selling techniques in our markets, based on market research to fill different needs, customs, and tastes.

Efforts in those fields should strengthen our domestic economy and enhance our competitive capacities, not only with imports but in the export field.



ORIGIN OF PACIFIC COAST SARDINE CANNING INDUSTRY

"Several efforts were made during the 1890's to establish sardine canning on Puget Sound or in Alaska where large quantities of herring were available, but all of these operations were shortlived. The first successful Pacific Coast sardine cannery was established at San Pedro, California, in 1896. The industry developed slowly until 1917 when the pack was suddenly increased to a large amount by war demands. After the war, production was maintained and increased by extensive cultivation of the export trade."

--"Principles and Methods in the Canning of Fishery Products,"
Research Report No. 7 (page 4),
U. S. Fish and Wildlife Service.

HYDRAULIC PRESS FOR LABORATORY PREPARATION OF FISH PRESS CAKE

By Lynne G. McKee* and Richard W. Nelson**

INTRODUCTION

In the preparation of fish meal, fish waste material is often cooked and pressed to expel oil and water. The product formed is fish press cake. Fish meal results when this material is dried and ground.

In the production of experimental lots of fish meal at the Seattle Technological Laboratory, about 16 pounds of fish material are cooked and pressed to prepare one batch for the experimental fish meal dryer. Formerly, a small laboratory press with a capacity of about 4 pounds of material was used to prepare the press cake. As the use of this device required four pressings for one charge of the dryer, the pressing operation required considerable time. Also, some of the material cooled below the desired pressing temperature before the operator could complete all four pressings.

To save time and to facilitate pressing the material while it still is hot, which helps to remove the oil and water, we designed and built a press with enough capacity to handle 16 pounds of cooked material at each pressing.

The purpose of this report is to describe the design, construction, and operation of this press.

DESIGN

The press (fig. 1) consists essentially of (1) a head, (2) a hydraulic jack, (3) a pressure gauge, (4) a movable platen, (5) a stationary platen, and (6) a stand on which the press is mounted.

In the design of the press, features such as light weight, portability, and simple construction were incorporated. The construction used eliminated the need for patterns, heavy casting, and machining.

CONSTRUCTION

Extruded aluminum channel 2" x 2" x $\frac{1}{4}$ " was used for the head, the movable platen, and the stationary platen. The channels, cut to length, were bolted together side by side with spacers between the flanges to resist collapsing when the through bolts were tightened. Two of the units, containing eight channels each, were used--one on top of the other, with the channels at right angles--for the head of the press. The stationary platen is similar except that 10 channels were used instead of 8 and a $\frac{1}{4}$ -inch aluminum plate was attached to the upper side to serve as a liquid-tight surface. The movable platen consists of a single set of eight channels with a $\frac{1}{4}$ -inch aluminum plate attached to the lower side to serve as the pressing surface.

The hydraulic jack was mounted in an inverted position with the base of the jack bolted to the head of the press. This arrangement protects the jack from coming in contact with the expressed liquids from the fish.

The hydraulic gage was mounted on a high pressure pipe tee next to the jack.

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The pressure pump for the hydraulic jack was mounted in an accessible position on the side of the press stand. High pressure hydraulic tubing was used for the connection between the pump and the jack.

The movable platen, which is guided by four corner posts that connect the base and the head (see fig. 1), is held against the ram of the jack by four suspended coil springs. During operation, as the pressure is released, the springs return both the ram and the platen to the starting point.

In order that the expressed liquids can be caught, the edges of the stationary platen was fitted with an angle iron dam. A $\frac{1}{2}$ -inch drain outlet was located in one corner of the platen.

The entire press was mounted on an angle-iron stand fitted with casters to provide mobility.

Cost of the materials used to construct the press was less than \$350.

OPERATION

In addition to the press itself, the following equipment is needed to produce press cake: (1) 24-inch squares of press canvas, (2) a 10" x 10" x $1\frac{1}{4}$ " mold, (3) a spatula or a tamper, (4) four pieces of channel iron, and (5) $\frac{1}{8}$ -inch-mesh steel screens 12" x 12".

The press is operated as follows:

1. Lay a 24" square of press canvas on a flat surface and place the mold in the center of the canvas.
2. Fill the mold with the hot cooked fish material, using a spatula or a tamper to press the material into the mold.
3. Remove the mold and fold the cloth over the fish to make a pad approximately $1\frac{1}{4}$ " thick.
4. Prepare six similar pads to charge the press.
5. Lay four pieces of channel iron side by side on the press base

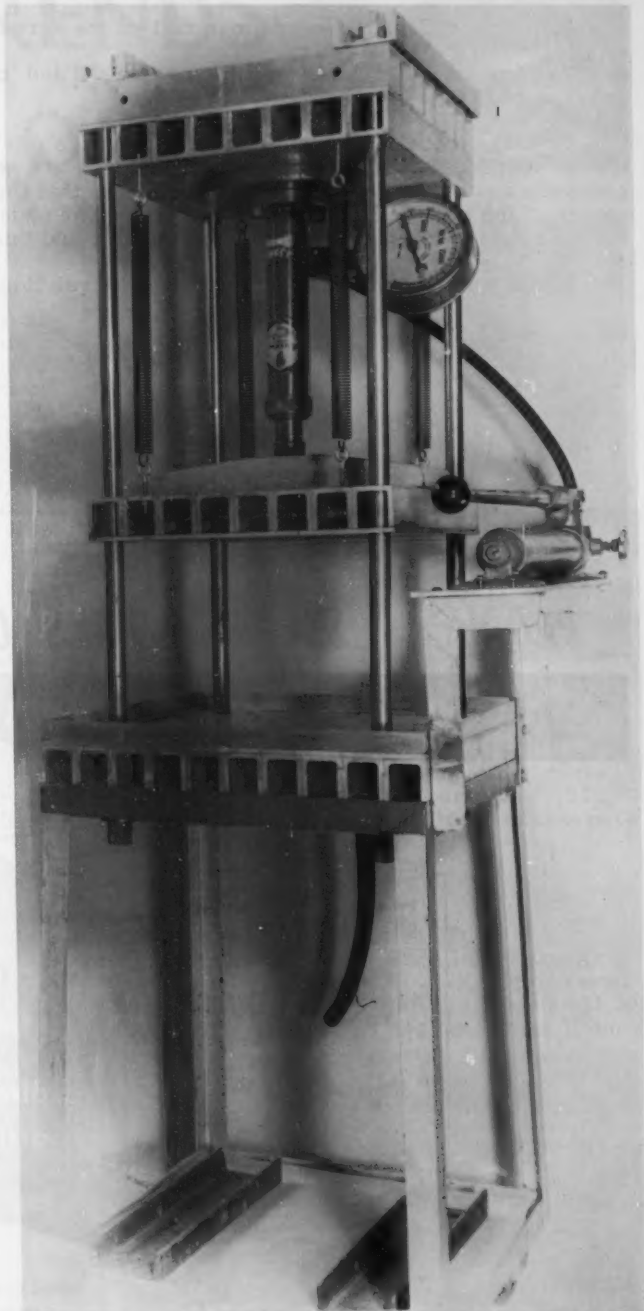


Fig. 1 - Hydraulic press for laboratory preparation of fish press cake.

and lay one of the steel-mesh screens on top. (The channel serves as a spacer to keep the bottom pad of material away from the liquid that accumulates on the stationary platen.)

6. Lay a pad of the cooked material on the screen and cover it with another screen.

7. Repeat this process until the press is filled, taking care to keep the pile of pads and screens straight.

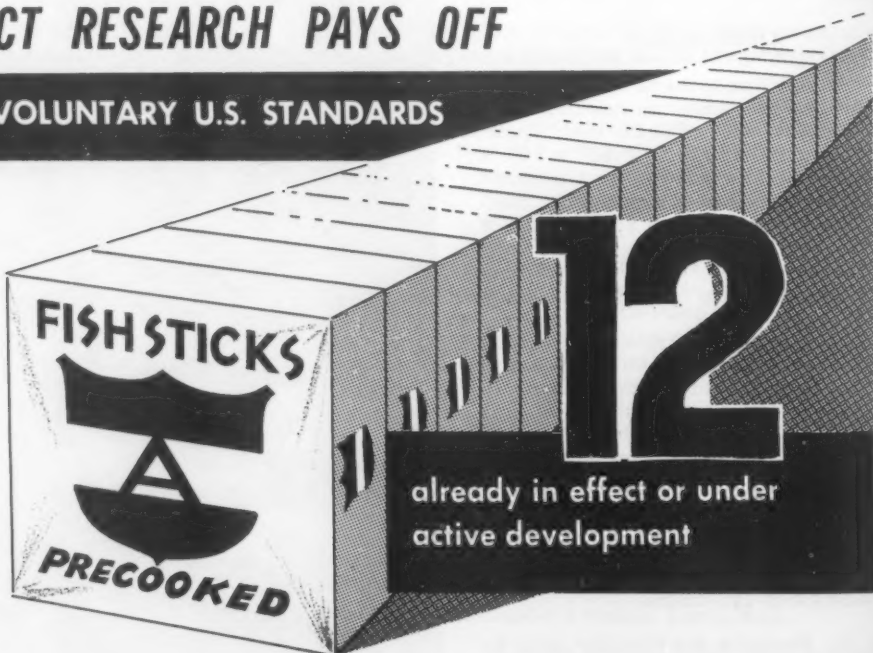
8. Make a preliminary press to compact the pile of pads and make room for the insertion of additional pads. If at this point the pads are not flattening out evenly, release the pressure and move the entire stack of pads so that the high side is more nearly under the center of the platen. Again apply pressure. The pads should flatten evenly. If they do not, turn the pads within the stack so that the thick and thin sides of the pads will level each other.

9. Complete the final press until all the free liquid has been removed.



PRODUCT RESEARCH PAYS OFF

VOLUNTARY U.S. STANDARDS



TRENDS AND DEVELOPMENTS

Alaska

BRISTOL BAY APPROACHES RULED ALASKA TERRITORIAL WATERS:

"The territorial waters of the State of Alaska in Bristol Bay are those waters within a line from Cape Newenham to Cape Menchikof on the Alaska Peninsula," ruled the First Superior Court of Alaska early in September 1962. This decision culminated an involved legal battle over Alaska's right to tax freezerships operating more than three miles offshore within Bristol Bay. Defense attorneys did not dispute the locations where the freezerships purchased salmon but argued that the accepted three-mile territorial limit placed the vessels outside Alaskan waters, therefore, they should not be subject to state taxation.

The Superior Court Judge stated that in his opinion the Federal Government "has asserted a claim to all Bristol Bay waters landward of a line drawn between Cape Newenham and Cape Menchikof as inland waters through interrelated administrative and judicial action" and that in order to control the fisheries of the area "jurisdiction has been, and must be, asserted to that extent."

RUSSIAN WHALING NEAR KODIAK:

Late in September 1962, a concentration of Russian whale catcher vessels moved into the area immediately south of Kodiak Island off Alaska. Patrol vessels traversing those waters estimated the Russian fleet at approximately 12 killer vessels. Fishing was apparently good as many whales were in evidence throughout the area. This movement appears to be a major shift of Russian whaling effort which was previously centered in the central Aleutian Islands.

SALMON PACK IN 1962 LARGEST IN TEN YEARS:

The Alaska canned salmon pack as of September 23, 1962, totaled 3,410,000 cases (48 1-lb. cans). This is the largest pack re-



Gill-net boat in Alaska with a load of red salmon.

corded since 1952, when the pack totaled 3,574,000 cases. The large pack this year was the result of the excellent run of pinks in Central Alaska, which accounted for 1,212,000 cases or 35.5 percent of the total Alaska pack of all species.

KODIAK AREA SALMON CATCH:

The total catch of salmon in the Kodiak district totaled 15,750,000 fish. Of that total, pinks accounted for 14,098,000, chums 821,000, reds 774,000, cohos 56,000, and kings 1,800



Salmon, clam, and crab cannery in Cordova, Alaska.

fish. The pink salmon catch exceed all previous even years in the history of the Kodiak Island fishery. The 565,770 cases of pinks packed constituted 70 percent of the total pack of 711,000 cases packed for the district.

SHRIMP CATCH UP IN 1962:

The Kodiak district shrimp catch in the first 9 months of 1962 was greater than the 1961 catch and that for any previous year. The Kodiak catch in 1961 was 11,084,000 pounds. The 1962 catch as of September 30 was 11,219,000 pounds.

HERRING 1962 SEASON SUCCESSFUL:

The herring reduction fishery in Southeast Alaska ended on September 12, 1962, following a decline in the availability of herring. The single reduction plant in operation experienced a relatively successful season with a total catch of over 13,800 short tons. The catch per unit of effort was better this season than that found in recent years. However, it is believed that the absence of competition among the several plants normally in operation may have contributed more to the success of fishing than did a possibly larger abundance of fish. Nearly 80 percent of the season's catch was four-year-old herring. The oil yield was high throughout the season.



Alaska Fisheries Exploration and Gear Research

CHARTERED TRAWLER BEGINS EXPLORATORY BOTTOM FISHING IN SOUTHEASTERN ALASKA:

Exploratory bottom fishing with the chartered trawler *Yaquina* was scheduled in the waters of Lynn Canal and Chatham Straits in Southeastern Alaska during October-November 1962, by the Bureau's Exploratory Fishing and Gear Research Base at Juneau. The principal objective is to determine the potential fisheries resources in Alaskan waters. The emphasis is on finding out the availability and abundance of fish and shellfish resources which might expand the commercial fisheries in that area. The principal

method to be used is bottom fishing with trawl gear at regular intervals down to depths



Yaquina, Bureau of Commercial Fisheries exploratory fishing vessel.

of over 400 fathoms (2,400 feet). Crab pots and experimental gear for octopus were to be used, as well as trawls.

The results of these surveys and similar studies by the Bureau of Commercial Fisheries may pave the way toward the increased use of valuable resources which are not now completely understood.

The *Yaquina* was to be used continuously from early July until November 1962 on king crab exploration near Kodiak, shrimp exploration in the Seward area, and bottomfish exploration in Southeastern Alaska. The king crab exploration ended on August 19, and the shrimp exploration was completed on October 4.

Note: See Commercial Fisheries Review, September 1962 p. 15.

STOCKS OF SHRIMP LOCATED NEAR PRINCE WILLIAM SOUND:

M/V "*Yaquina*" Cruise 62-2 (August 21-October 4, 1962): To define the availability of shrimp in the waters near the Kenai Peninsula and Prince William Sound was the principal objective of this 6-week exploratory cruise by the U. S. Bureau of Commercial Fisheries chartered vessel *Yaquina*. Shrimp catches in amounts up to 2,500 pounds

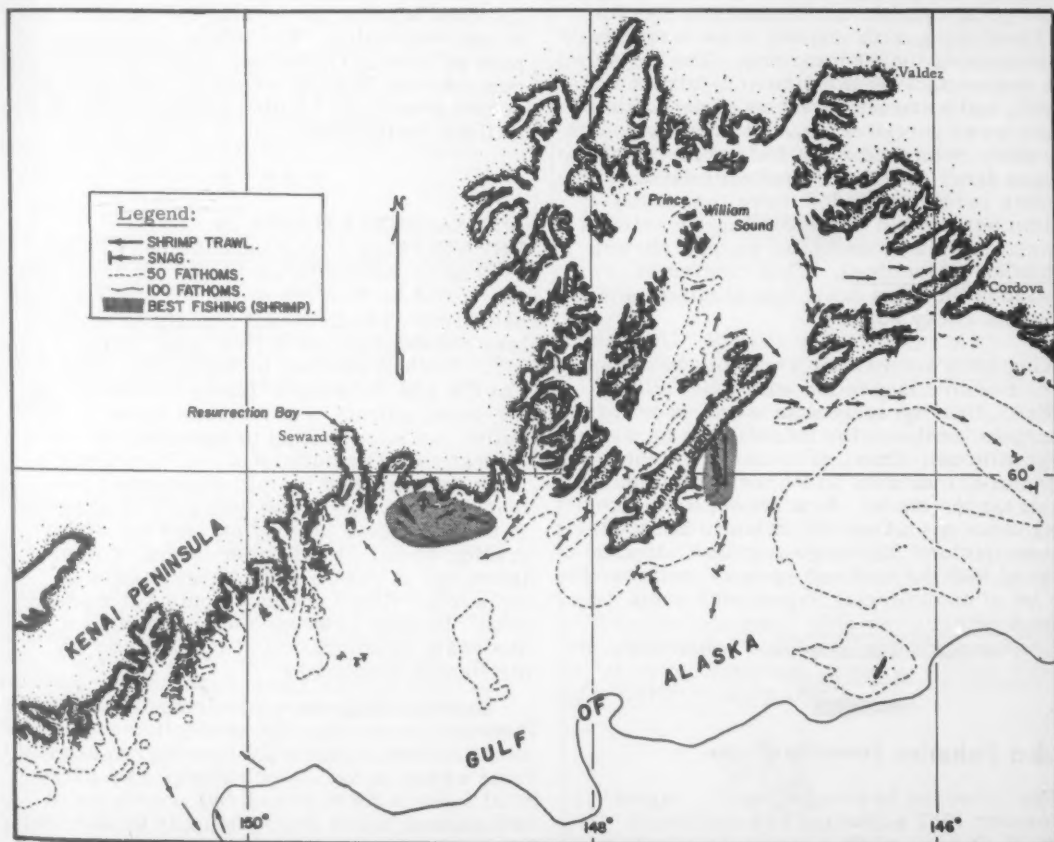
were made per 1-hour trawl drag during the trip.

A semi-balloon shrimp trawl, measuring 70 feet along the footrope, was used in a series of 93 drags lasting about one hour each. Depth intervals from 9 to 200 fathoms were sampled for indications of shrimp. Incidental to trawling, experimental shrimp pots were set at 11 locations.

Shrimp were caught at over 80 percent of the locations fished during the cruise. The dominant species caught was pink shrimp (*Pandalus borealis*), followed by side-stripe shrimp (*Pandalopsis dispar*). Other species were also caught in small quantities. Best fishing during the survey was east of Montague Island off Patton Bay. Four 1-hour trawl drags in depths from 45-75 fathoms in that area, yielded a catch of approximately 8,000 pounds of shrimp. Most of that catch was



Stern view of vessel Yaquina showing reel retrieving and stowing trawl net.



Explorations in Alaskan waters by chartered vessel Yaquina Cruise 62-2 (August 21-October 4, 1962).

pink shrimp averaging about 80 individual shrimp (heads-on) to the pound. Commercial vessels fishing for shrimp near Kodiak Island usually maintain catch rates of about 3,000 to 4,000 pounds an hour or more.

Other areas where good signs of shrimp were found included off Johnstone Bay where 1,100 pounds of shrimp were caught during two 1-hour drags. It was of particular significance that over two-thirds of the shrimp caught in that area were the side-stripe variety averaging from 28 to 36 shrimp (heads-on) per pound. Trawl catches in the vicinity of Hinchinbrook Island indicated a fair concentration of shrimp with several catches of over 500 pounds. Most of those were small shrimp not suitable for commercial use.

The results of limited pot-fishing experiments did not indicate that it was a good method of catching shrimp. Fifteen individual pots, cylindrical-shaped and measuring 3 feet long, with tunnels at each end, were set at each of the 11 locations. The baited pots were attached to a line at 5-fathom intervals and were anchored on rocky bottom where trawl sampling was not practical. The pots were retrieved after fishing for periods ranging from 12 hours to several days. Catches rarely exceeded more than a few shrimp per pot but included small quantities of large 6 to 10 count heads-on spot shrimp (*Pandalus platyceros*). This confirmed prior knowledge that this desirable shrimp species frequents rocky bottom.

King crab and halibut were tagged during the cruise in cooperation with independent studies. Hydrographic data were recorded at certain locations for information on water temperatures. Trawl catches during the cruise also indicated widespread distribution of tanner crabs. In addition, a single trawl catch near Cape St. Elias in 58 to 62 fathoms yielded 300 large scallops. It was believed that the last two species mentioned may be of commercial importance some time in the future.

Note: See Commercial Fisheries Review, November 1962 p. 17.



Alaska Fisheries Investigations

The following is a report of the August-September 1962 activities and studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Auke Bay, Alaska.

PINK SALMON STUDIES:

Attempts to regulate the even-year stock of pink salmon in Sashin Creek, Alaska, were apparently successful. The purpose of this study is to determine if the run of pink salmon in a particular stream can be re-established naturally. It is not certain whether the pink salmon entering Sashin Creek fish are strays from neighboring watersheds. However, it is concluded that for 1962, substantial straying did not occur. This was one of the questions set forth when the small even-year cycle was controlled at Sashin Creek.

The spawning escapement of pink salmon into the Olsen Bay stream was in excess of 50,000 fish. Studies so far indicate that there is an egg saturation point in the gravel beyond which further spawning would not be beneficial. In the Olsen Bay study area this may mean that the final one-fourth of the run spawned without increasing the actual amount of egg deposition. The heavy escapement of pink salmon at Olsen Bay, even after a heavy commercial fishery, resulted from the unexpected abundance of pink salmon in the Prince William Sound area.

RED SALMON STUDIES IN BRISTOL BAY-NAKNEK RIVER SYSTEM:

It is becoming increasingly apparent that young red salmon fry in the Bristol Bay-Naknek River system do not remain in a single lake even during their first year in fresh water. Tow net catches in September 1962 in Coville and Grosvenor Lakes indicated that the young salmon were concentrated in the outlet end of each lake preparatory to outmigration. The outmigration from Coville Lake was finished by mid-September but that of Grosvenor Lake was still in progress. In Coville River the red salmon fry outmigration seemed to be independent of light intensity; in contrast the outmigration to Grosvenor River occurred only during darkness. Brooks Lake also demonstrated a moderate outmigration of red salmon fry throughout September.

These findings have a bearing on the basic question concerning the productive capacity of the Naknek system for rearing red salmon. Lake areas in the lower system may play a vital role in the survival and abundance of red salmon races which initially utilize lake areas in the upper watershed.

YUKON RIVER SALMON RESEARCH:

The chum salmon run in the Rampart Canyon section of the Yukon River continued throughout September 1962. Heavy rains and severe landslides in the canyon area in early September resulted in the loss of one fish wheel and damage to the remaining wheel. Tagging operations were suspended for one week, and the last part of the late August-early September peak of the chum salmon run was missed. The chum salmon run was falling off rapidly at the end of September with a light showing of cohos coming in. Six king salmon were tagged during the week of September 23-29. To that date 7,900 chums, 1,380 kings, and 25 cohos had been tagged.

* * * * *

HERRING RESEARCH:

Eight additional radioactive herring tags were recovered in the Washington Bay herring reduction plant in September 1962, all of which had been released in 1961. From all the radioactive tags recovered so far it would seem that herring which spawn in such scattered places as Sitka, Auke Bay, Craig, and the Seymour Canal all mix together in the Frederick Sound and lower Chatham Strait areas.

Three radioactive tags had been recovered by the rejection equipment in early August in the herring reduction plant. One of these had been released by the Auke Bay Laboratory staff in 1960 and the other two in 1961. The development of suitable scanning, detection, and rejection of tagged fish from the herring production lines has been very difficult.

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KING CRAB RESEARCH:

Research on king crabs south of the Alaskan Peninsula got under way in the summer of 1962 and in August the chartered M/V Paragon released 2,000 tags on its king crab tagging pattern between Chirikof and Trinity Islands. Most of the crabs were taken at depths around 60 fathoms. The sample area between the Shumagin and Chirikof Islands yielded very few crabs, producing only 142 tag releases.

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MAIDEN VOYAGE OF NEW OCEANOGRAPHIC RESEARCH VESSEL:

The oceanographic research vessel Murre II returned to Juneau, Alaska, the latter part of October 1962 after completing her maiden voyage. The Murre II, is an 86-foot power scow being operated by the Auke Bay Biological Laboratory of the U. S. Bureau of Commercial Fisheries. The Bureau's oceanographer aboard stated the cruise marked the beginning of a program to relate oceanographic conditions to production of fish and shellfish. The trip served as a shakedown and training cruise for the Bureau's oceanographers and three scientists from the Douglas Marine Station of the University of Alaska.

The Murre II visited five stations during the cruise. Physical, chemical, and biological data were collected in Behm Canal, Clarence Strait, Sumner Strait, and in Chatham Strait off Little Port Walter and off Washington Bay. The preliminary survey included measurements of sea temperatures, salinity, oxygen content of the water, and chemical analyses for mineral content. Tows were made at each station to collect zooplankton (minute animals important as food for many species of fish) present in those waters.

**American Samoa****TRAINING PROGRAM FOR SAMOANS TO LEARN LONG-LINE TUNA FISHING:**

The United States canning firm which operates the tuna cannery in American Samoa in January 1961 began a fishery training program for Samoans to learn the use of long lines in fishing for tuna. The United States firm in 1954 leased from the United States Government and started operating the tuna cannery in American Samoa. The cannery provides employment for about 400 Samoans.

Negotiations were under way in the summer of 1962 for another United States firm to construct a second cannery. (South Pacific Bulletin, July 1962.)



California

MIDWATER TRAWLING FOR SALMON FINGERLINGS CONTINUED:

M/V "Nautilus" Cruise 62-N-9a-Salmon (September 5-8, 1962); 62-N-9b (September 17-21); 62-N-10a (October 1-5): Mid-water trawling in the Carquinez Strait for marked salmon fingerlings on their seaward migration were continued by the California Department of Fish and Game research vessel Nautilus. A nylon midwater trawl with a 25-foot square opening, and a cotton midwater trawl with a 15-foot square opening were used.

Trawling was conducted between 8 a.m. and 3 p.m. and each tow lasted 20 minutes. All tows were alternated between upstream and downstream, and between the north shore, center, and south shore of the channel.

A total of 150 tows completed in the Strait during the cruises yielded a catch of 48 king salmon (*Oncorhynchus tshawytscha*), and 15 adult rainbow trout (*Salmo gairdneri*). Two of the salmon were adults, one of which was marked D-RM. The marked salmon was released in the Sacramento River at Hamilton City in 1959.

Other Species Caught by the Nautilus on Cruises 62-N-9a, 9b, and 62-N-10a

Species	Number
Northern anchovy (<i>Engraulis mordax</i>)	53,900(est.)
American shad (<i>Alosa sapidissima</i>)	2,750
Pacific herring (<i>Clupea pallasii</i>)	2,000(est)
Jacksmelt (<i>Atherinops californiensis</i>)	1,000(est)
Striped bass (<i>Morone saxatilis</i>)	915
Sacramento smelt (<i>Spirinchus thaleichthys</i>) . . .	341
Threadfin shad (<i>Dorosoma petenense</i>)	101
Northern midshipman (<i>Porichthys notatus</i>) . . .	58
King salmon (<i>Oncorhynchus tshawytscha</i>) . . .	48
Rainbow trout (<i>Salmo gairdneri</i>)	15
Surfmelt (<i>Hypomesus pretiosus</i>)	9
Starry flounder (<i>Platichthys stellatus</i>)	8
Staghorn sculpin (<i>Leptocottus armatus</i>)	3
Walleye surfperch (<i>Hyperprosopon argenteum</i>) . . .	3
Topsmelt (<i>Atherinops affinis affinis</i>)	2
Three-spined stickleback (<i>Gasterosteus aculeatus</i>) .	1
Pipefish (<i>Syngnathus griseo-lineatus</i>)	1
Shiner perch (<i>Cymatogaster aggregata</i>)	1
Splittail (<i>Pogonichthys macrolepidotus</i>)	1

These cruises conducted in September-October 1962 conclude a 33-cruise series started on April 10, 1961, by the California Department of Fish and Game. All were reported in previous issues of Commercial Fisheries Review.

Note: See Commercial Fisheries Review, November 1962 p. 21.

PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 62-A-5-Pelagic Fish (September 18-October 7, 1962): The objectives of this cruise were to: (1) survey the sardine population to determine the amount of recruitment from this year's sardine spawning, and to measure the population density of older fish; (2) sample other pelagic species for age, length, and distribution studies; (3) evaluate the midwater trawl as a tool for sampling pelagic species; and (4) collect live sardines for blood genetic and other studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory at La Jolla, Calif. The coastal waters of central Baja California, Mexico, from Ballenas Bay to Blanca Bay were the areas explored by the California Department of Fish and Game research vessel Alaska during this cruise.



M/V Alaska Cruise 62-A-5-Pelagic Fish, explorations in coastal waters of central Baja California, Mexico.

Night Light Stations: A total of 48 night light stations were occupied. Sardines were present at 9 stations, anchovies at 7, Pacific mackerel at 18 and jack mackerel at 8.

Sardines were scarce south of Point San Eugenia and around Cedros Island. Two of

the 4 samples taken in those areas consisted of single fish-of-the-year found in catches of other species. Another sample from Rompiente Bay, was taken from a large school of 1961 year-class sardines mixed with top-smelt and Pacific mackerel. The fourth sample consisted of a few older fish taken with a sample of Pacific mackerel from South Bay, Cedros Island.

Sardines were more abundant in the southern part of Sebastian Vizcaino Bay. Large numbers of sardines were attracted on 4 out of 5 stations in that area. They were adult fish, ranging from 165 to 206 millimeters in standard length. Most of the fish were in an advanced state of maturity, with one ripe female noted in the samples taken.

Adult sardines were also caught in Playa Maria Bay. They ranged from 176 to 204 millimeters standard length, and were not in as an advanced stage of maturity as those from the southern part of Sebastian Vizcaino Bay. A total of about 900 sardines from southern Sebastian Vizcaino Bay, and 400 from Playa Maria Bay were delivered alive to the Bureau of Commercial Fisheries Biological Laboratory at La Jolla for further study.

Midwater Trawl Stations: Thirteen tows were made with the midwater trawl, all either at the surface or within 50 feet of the surface. The first 10 tows were made during the day, the last three were made at night. All tows were made in areas where night light stations were also occupied.

Daytime tows were disappointing as compared with night light stations. The first tow in San Hipolito Bay caught nothing. The next three tows were made in Ballenas Bay, where night light stations showed threadhering to be abundant. Two of those tows again were blank, but the third caught 15 sierra ranging in size from 18 to 28 inches, and one 14-inch bonito.

The next tows were made along the east side of Cedros Island. The first of 3 tows yielded 416 bonito weighing from 1 to 2 pounds each, the second tow was a blank, and the third yielded 5 larger bonito, weighing $3\frac{1}{2}$ to 4 pounds each.

Three daylight tows were made in the southern part of Sebastian Vizcaino Bay, where sardines were known to be abundant

from night-light work. No fish were caught in those tows.

The last three tows were made at night, between Playa Maria and Blanca Bays. Sardines had been caught in Playa Maria Bay on a light station the previous night. A trawl tow in that area yielded 450 sardines and 30 squid mixed with a few bat rays, Pacific mackerel, and round herring. The second tow, off False Bay, yielded pompano and a few anchovies, while the last tow, in Blanca Bay, caught 60 sardines and about 500 squid. The sardines caught in those tows were adult fish, and the samples appeared similar in all respects to the night-light sample from Playa Maria Bay. No schools had been sighted visually or with the depth finder during those tows.

It was evident that daylight tows did not produce samples comparable to night-light samples. This may have occurred because the same fish were not available in the same areas during the day, or because the fish were able to see and avoid the net during daylight. But the few night tows that were made indicated good comparability. Whether or not night tows will be comparable under a variety of conditions remains to be tested.

Only 9 schools were sighted during 300 miles of night scouting between stations. Although scouting conditions were often poor, with poor phosphorescence and choppy seas, schools were not evident even when scouting conditions were good.

The weather was fair during most of the cruise, although a tropical storm south of Point Eugenia in the early part of the cruise, and strong westerly winds on the last working day caused a loss of two nights' work.

Sea surface temperatures ranged from 64.2° F. off Black Point to 74.8° F. off Abreojos Point.

Note: See Commercial Fisheries Review, November 1962 p. 18.

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Airplane Spotting Flight 62-9-Pelagic Fish (September 4-6, 1962): To assist in evaluating a midwater trawl as a tool for sampling the pelagic environment by locating fish schools and guiding its research vessel Alaska over them was the objective of this aerial survey by the Twin Beechcraft N5614D of the California Department of Fish and Game. On this flight, the aircraft surveyed the inshore area from Long Beach to

San Diego, and the offshore islands and banks of southern California and northern Baja California, Mexico.

Low clouds and poor visibility limited scouting to the afternoon on each day of the flight when conditions varied from poor to fair.

The coastal area from Long Beach Harbor to the United States-Mexican Border was scouted on the first day but no fish were sighted. There was extensive red water in Long Beach Harbor, and off Newport Beach the organisms responsible for the red water had converged in drifts at oblique angles to the shore. Small patches of red water were sighted off Laguna Beach, Doheny State Park, San Mateo Point and Point Loma.

On the second day of the flight, the area surveyed was from San Diego to the Coronados Islands, then to Sixtymile Bank, Cortes Bank, San Clemente and Santa Catalina Islands. A cloud deck between 500 and 1,000 feet above the ocean covered most of the general area. Because of that, flying was at a lower altitude than the normal 1,500 feet. An unidentified whale and 16 albacore boats were sighted off Sixtymile Bank. Scouting conditions around San Clemente and Santa Catalina Islands were only fair because of some scattered clouds.

The research vessel Alaska was notified of the three Pacific mackerel and two unidentified fish schools sighted off the southeast end of San Clemente Island. A small purse seiner was making a set in that area, and later delivered 10 tons of Pacific mackerel to the cannery. The Alaska made a midwater haul in the general area about 7 hours later and netted 16 jack mackerel, as well as an assortment of small, non-commercial fish species and invertebrates.

A total of 7 deep schools believed to be jack mackerel, were sighted off the southeast end of San Clemente Island on the last day of the flight. They were round, yellowish-brown schools that did not flash. The research vessel was directed over one of the schools and as she went over it, divided it into two separate schools. The depth-finder aboard did not detect any traces of the school. The midwater trawl had not been set. The second school successfully evaded the vessel and the net. The midwater trawl limited the maneuverability of the vessel,

which together with the speed of the fish school, prevented catching any fish.

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Airplane Spotting Flight 62-10-Pelagic Fish (September 10-12, 1962): To determine the distribution and abundance of pelagic schools, the inshore area from the United States-Mexican Border to Point Conception was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.

The first day's survey covered the area from Redondo Beach to the United States-Mexican Border. A total of 21 anchovy-schools were observed off Point Loma. The anchovy concentration between Point Loma and the border, present the six months previous to September 1962, was not seen on this flight.

On September 12, the last day of the flight, the area from Redondo Beach to Point Conception was surveyed. Thirteen anchovy schools were sighted south of Goleta Point and 17 off Pitas Point. Both of those school groups were only 200 to 300 feet offshore. That number of schools was small compared to the hundreds usually found in the area.

During the month of August, the anchovy schools observed from Goleta to Ventura were also 200 to 300 feet offshore, instead of 1 to 3 miles offshore as they had been during the previous six months. An influx of bonito may have caused the change in location of the anchovy school groups.

Small patches of red tide were present in many places along the coast. It was impossible to survey the area north of Point Conception on this flight because of cloudy weather.

Note: See Commercial Fisheries Review, November 1962 p. 20.

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Airplane Spotting Flight 62-11-Pelagic Fish (October 16-17, 1962): To determine the distribution and abundance of pelagic schools, the inshore area from the United States-Mexican Border to Santa Cruz was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.

The coastal waters from Los Angeles International Airport to Santa Cruz were surveyed on the first day's flight. A total of 13 anchovy schools were counted south of Cape San Martin. Between the Salinas River and Monterey, 46 anchovy schools were counted.

On October 17, the coast from the United States-Mexican Border to the Los Angeles International Airport was surveyed. Three small schools, probably anchovies, were observed off the "Barn," a familiar local landmark between Dana Point and Oceanside. Red tide was prevalent along the coast from Santa Barbara to Oceanside, and also the in-shore waters of Monterey Bay. The color of the red tide had faded since the aerial survey conducted in August 1962. The brightest red tide in southern California was in the areas between Gorda Point and Point Hueneme, and from Long Beach to Newport. Both those areas are flat, shallow, and sandy. Red tide was negligible off rocky shores such as Palos Verdes and much of central California.

Note: See Commercial Fisheries Review, November 1962 p. 20.

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ABALONE GROWTH STUDIES CONDUCTED FOR COMMERCIAL AND SPORT FISHERY:

M/V "N. B. Scofield" and M/V "Mollusk"
First Cruise 62-S-5 and 62-M-1-Abalone
(August 15-27, 1962); Second Cruise 62-S-6
and 62-M-2-Abalone (September 5-17, 1962):
The objectives of these cruises were to: (1) examine areas of commercial and sport abalone fishing, (2) examine established stations, (3) collect samples for maturity and growth studies, and (4) tag a limited number of abalones for transplanting experiments. The mainland coastal areas of Avila and San Simeon, and the Channel Islands of Santa Catalina, San Clemente, Santa Barbara, San Nicolas, Santa Cruz, Santa Rosa, and Anacapa, were explored by the California Department of Fish and Game research vessels N. B. Scofield and Mollusk during August and September 1962.

Results of the First Cruise by area were:

Avila: No abalones were found on any of the dives. There was no explanation for this since the bottom and general environment appeared suitable for them.

San Simeon: The abalones sampled here had well-developed gonads and appeared to be approaching spawning. Sizes ranged from 153 to 216 millimeters but most were between 190 and 198 millimeters. All but two showed evidence of the previous season's growth. Several had added over 2.5 centimeters of shell. This season's growth ap-

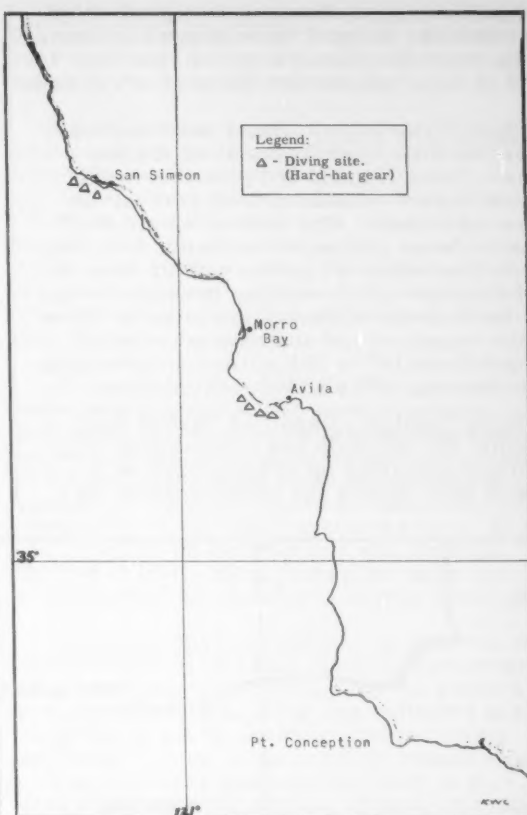


Fig. 1 - Shows diving stations during Cruises 62-S-5 and 62-M-1 by research vessel N. B. Scofield and Mollusk.

peared to be just starting; most of the sampled abalones had added 1 to 2 millimeters of shell.

Because of rough weather, plans for diving along the mainland coast were changed and operations were shifted to San Miguel and Santa Cruz Islands.

San Miguel Island: At Station ISM, considerable bottom changes had taken place since the previous year. Sand had moved in over large areas, almost completely covering the rocks; most of the kelp was growing through the sand but no abalones were present. At the east end of the station, rocks were almost bare and covered with sea urchins. In the middle area, the kelp growth was so thick it was difficult to get through, but no abalones were found. Abalones were finally located at the extreme west end of the area. Many young were found on the undersides of rocks. Forty mollusks, 144 to

220 millimeters across, were collected for Marineland. Many of those showed evidence of the previous season's growth, and only 1 or 2 of them had started this season's growth.

Santa Cruz Island: Dives were made at Scorpion Cove, a representative abalone area. Almost all red and pink abalones collected showed considerable growth for the previous season. The ratio of 42 red to 17 pink abalones compared favorably with the trend first observed a year earlier (that the red abalones are increasing in numbers on the north shore of Santa Cruz Island). Sizes in the sample of red abalones collected ranged from 148 to 201 millimeters but most were between 175 and 190 millimeters.

Santa Catalina Island: At Harbor Reef (Station 1C), the kelp had continued to return and was about as concentrated as it was in 1957, before the influx of warm wa-

ter. Many young pink abalones, all of which were in good condition, were observed feeding. Most showed new shell growth but not an exceptional amount.

Results of the Second Cruise by area were:

Santa Rosa Island: An effort was made to inspect black abalones tagged in 1961 at Station ISR, but rough weather prevented sampling them.

Anacapa Island: Diving was delayed because both divers working on this project had mild respiratory infections. First dives were made on the north side where bottom conditions appeared good, but abalones were scarce. Skin and SCUBA divers frequent this area and as a result it is heavily fished, which may account for the scarcity of abalones. At Anacapa Station 1A, on the south side, few

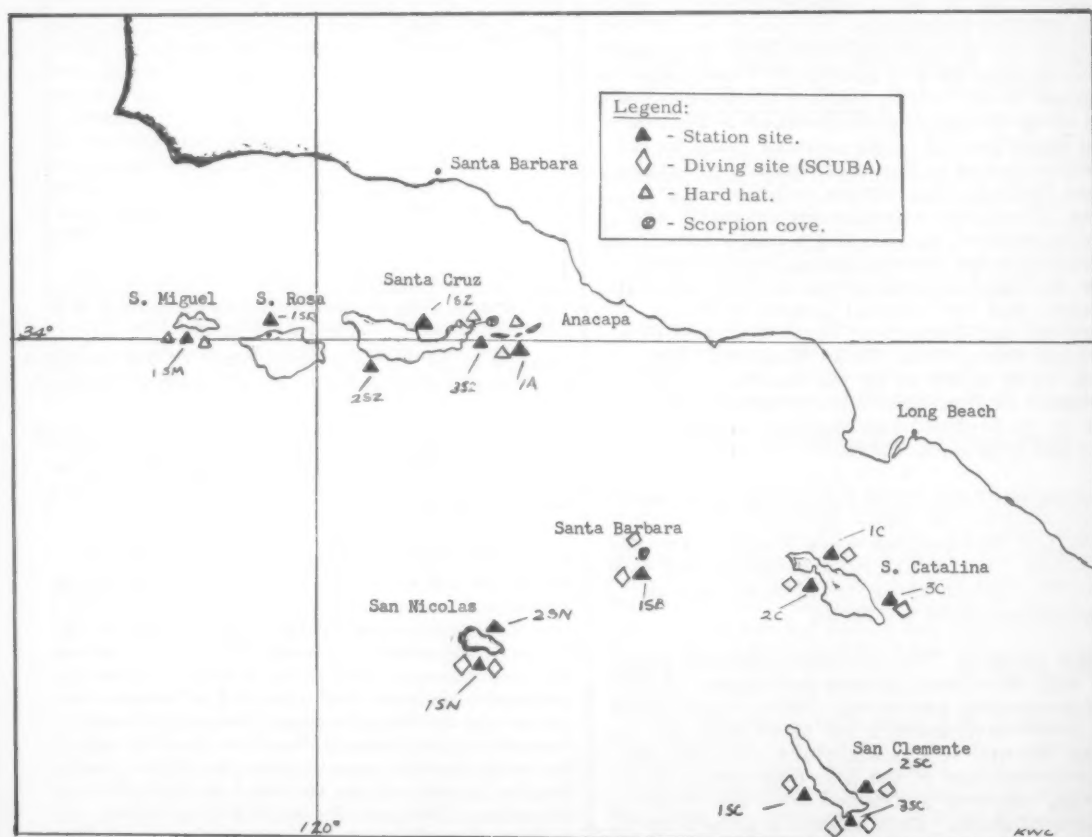


Fig. 2 - Shows stations and diving sites during Cruises 62-S-6 and 62-M-2 by research vessels N. B. Scofield and Mollusk.

abalones were observed. Kelp continues to return, but bottom conditions unfavorable to abalones (increases in sand and sea urchins) appeared to be spreading.

Santa Barbara Island: At Station ISB, kelp was not as dense as a year earlier. Many abalones were close to shore and on the undersides of rocks, and there was no evidence of unusual growth. Spot dives on the north side of the main island in the thick growth of *Postelsia palmaeformis* revealed only an occasional abalone, but on the edge of kelp beds, great concentrations of sea urchins were observed.

San Nicolas Island: A sample of 40 red and 11 pink abalones was taken from Station ISN. Reds ranged from 65 to 230 millimeters across, with 25 of them between 200 and 230 millimeters. Considerable growth of the previous year was evident on almost all shells, and only a small amount for the current season.

Pink abalones showed recent growth of from 2 to 4 millimeters. Both the red and pink species had well developed gonads, approaching spawning condition. The greatest abalone concentrations were found in 50- to 60-foot depths.

San Clemente Island: Abalones appeared to be less numerous at Station ISC than the year earlier. The previous season's growth ranged between 3 to 5 millimeters, and little or no growth for this season was observed for pinks. Growth on green abalones was highly irregular, ranging from 0 to 2 inches.

At Pyramid Cove (Station 2SC), pink and green abalones were found in large concentrations. In some areas they were stacked 2 and 3 deep. Abalones were not present in such numbers the previous year in this area. Several of the greens were in spawning condition but the pinks were not.

At China Cove (Station 3SC), commercial divers were working, but dives in connection with this project were made in the immediate area. Legal-size pink abalones were scarce. The commercial divers had been working for several hours and had only a few dozen abalones. This area has been heavily worked by commercial divers during the past year.

Santa Catalina Island: Abalones at Station 2C were more numerous than the previous year and there was a noticeable increase in small (1- to 3- inch) individuals.

A pink abalone tagged in October 1958, which had grown 18 millimeters by September 1962, was recovered from this station. All 145 abalones taken at San Nicolas, San Clemente, and Anacapa were measured, tagged, and placed in Station 2C. At Station 3C (Avalon Harbor), about 30 pink abalones tagged in 1957 with plastic disks were found. The disks had completely deteriorated and only the wire remained.

At Station IC, empty shells of two red abalones transplanted in 1956 were recovered. Both were recovered in 100 feet of water and neither one had grown after tagging. At a depth of 115 feet, three young white abalones (*H. sorenseni*), $\frac{3}{4}$, $1\frac{1}{2}$, and 4 inches across, were recovered from the undersurface of a rock. Kelp had returned on the reef and was about as thick as in 1956. Many young pinks were observed and all appeared to be in good condition.

Summary of Observations: In general, the environment of all areas showed a progressive improvement in food supply for the present abalone population. This was reflected in an increase in the numbers of growing young abalones in most areas. Where commercial fishing pressure had been heaviest, legal-size abalones were scarce. Where skin-diving pressure had been heavy (Anacapa), abalones of all sizes were scarce. Most of the abalones showed considerable growth for the previous season. This season's growth was just beginning.

Gonad examinations indicated that spawning had not yet occurred, although most were approaching ripeness. The over-all condition of the abalone resource is encouraging from a biological standpoint. If present conditions prevail, it should remain so for the balance of the season.



Cans--Shipments for Fishery Products

JANUARY-AUGUST 1962:

The amount of steel and aluminum consumed to make cans shipped to fish and shellfish canning plants during January-Au-

gust 1962 was 7.5 percent above that used during the same period in 1961. Prior to 1962, the figures covered only tinplate cans, but beginning with January 1962 aluminum cans are included. It is believed that only a small amount of aluminum is being used in cans for fishery products at present.



A total of 2,247,559 base boxes of steel (tinplate) and aluminum were used in the manufacture of cans shipped to fishery plants during the first eight months of 1962, whereas in the same period of 1961 (when only tinplate was reported) 2,056,663 base boxes of steel were consumed. The increase was mainly due to larger packs of Maine sardines, shrimp, salmon, mackerel, and tuna during 1962.

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BY AREAS, JANUARY-JUNE 1962 AND 1961:

A total of 1,510,280 base boxes of steel and aluminum were used in the manufacture of cans shipped to fishery firms during the first half of 1962. Of the total, 73.9 percent was used in cans for shipments to the Pacific Area or West (including Alaska and Hawaii). The bulk of the fish-canning facilities are located in the Pacific Area. The Pacific Area was followed by the Eastern Area with 23.0 percent. The



Southern Area and the Central Area combined used only 3.1 percent.

The over-all total in the first half of 1962 was up 4.0 percent from that for the same period of 1961. An increase of 6.9 percent in the amount of metal used in cans for shipment to the Pacific Area was partly offset by a drop of 3.5 percent in the total amount used for the Eastern, Southern, and North Central Areas. The increase in the Pacific Area was due to a greater pack of tuna.

The average wholesale price index for tinplate cans during January-May 1962 showed an increase of 2.7 percent over the average in 1961 and an increase of 5 percent over the average in 1957-59. The average wholesale price index for tinplate cans in January-May 1962 was 80.4 percent above the average in 1947.

Notes: (1) Statistics cover all commercial and captive plants known to be producing cans. The data for 1961 cover only shipments of steel (tinplate) cans, but the data for 1962 cover shipments of steel and aluminum cans. It is believed that only a small amount of aluminum is being used in cans for fishery products at present. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. The tonnage equivalent figure for 1961 data is derived by use of the factor 23.0 base boxes per short ton of steel. The tonnage equivalent figure for 1962 data is derived by use of the factor 21.8 base boxes per short ton of steel.

(2) See Commercial Fisheries Review, August 1962 p. 17.



Central Pacific Fisheries Investigations

TUNA STUDIES IN SOUTH PACIFIC CONTINUED:

M/V "Charles H. Gilbert" Cruise 59 (July 23-August 15, 1962): One of the objectives of the cruise was to conduct long-line

U. S. Domestic Shipments of Metal Cans for Fishery Products,
First and Second Quarters, 1961 and 1962
(Base Boxes of Metal Consumed in the Manufacture of Cans for Fishery Products)

Receiving Area	First Quarter		Second Quarter		Jan.-June	
	1962	1961	1962	1961	1962	1961
East ^{2/}	158,531	2/	189,556	2/	348,087	2/
Southern	13,403	2/	32,668	2/	46,071	2/
North Central	63	2/	29	2/	92	2/
Total ^{2/}	171,997	193,223	222,253	215,510	394,250	408,733
West ^{3/}	414,199	335,133	701,831	708,423	1,116,030	1,043,556
Total all areas . .	586,196	528,356	924,084	923,933	1,510,280	1,452,289

^{1/}Includes Puerto Rico.

^{2/}The grouping of States by geographic areas for reporting purposes was changed in 1962 so only total shipments in 1961 to the East, Southern, and North Central areas are shown.

^{3/}Includes Alaska and Hawaii.

fishing for tuna and other climax predators so as to provide specimens for studies by the University of Washington. The Line Islands and waters southwest of Christmas Island were the areas where the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert operated during this cruise. The vessel, which departed Honolulu, Hawaii, on July 23, 1962, made bathythermograph casts, collected surface salinity samples, dropped drift cards, and made plankton tows on the initial leg of the cruise to Christmas Island, where she arrived on July 29. The vessel departed Christmas Island on that same day and conducted long-line fishing, plankton tows, Nansen bottle casts, and serological collecting in waters

dropped, on the return trip to Honolulu, where the vessel arrived on August 15.

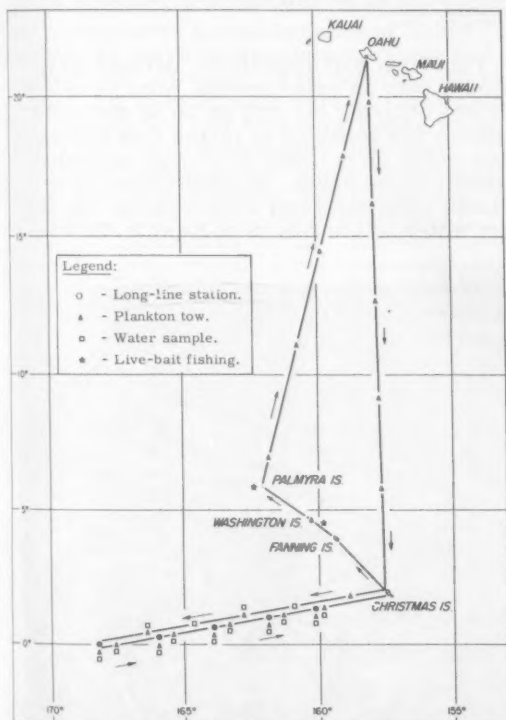
Five long-line stations were occupied at various locations. Sixty baskets of 6-hook, 210-fathom main-line gear with 16-fathom droppers were fished at each station. The catch rate of tuna (number per 100 hooks) ranged from 0.6 at Station 11 to 4.2 at Station 27. A total of 23 yellowfin, 9 big-eyed, 4 shipjack, 1 albacore tuna, 4 marlin, 1 sailfish, 1 wahoo, and 5 sharks were caught at the 5 long-line stations.

Tissues were taken from long line-caught fish and frozen for further study by the University of Washington. Those tissues were: samples of eyes: 7 yellowfin; samples of livers and muscle: 23 yellowfin, 9 big-eyed, 4 skipjack, 1 albacore, 4 sharks, 4 marlins, 1 sailfish, 1 wahoo. In addition, samples of eyes, muscle, liver, and vertebrae were collected from 3 yellowfin taken by live-bait fishing near Palmyra Island, and 1 yellowfin caught trolling near Fanning Island.

Another objective was to collect plankton using 1-meter open nets as follows:

1. Eight 30-minute surface plankton tows and 30-minute tows at a depth of approximately 50 meters (164 feet) were made using 1-meter open nets in the waters southwest of Christmas Island. Displacement volumes ranged from 73 to 255 ml. after large organisms were removed.
2. On runs between Honolulu and the Line Islands, a 30-minute surface plankton tow was made each evening at 9 p.m. with a 1-meter open net. Those samples were to be turned over to the University of Washington after pontellid copepods were removed.

The third objective was to collect water samples to a depth of 300 meters (984 feet) using Nansen bottle casts. Five Nansen bottle casts (without reversing thermometers) were made at each long-line position to obtain water samples above and below the thermocline. Four Nansen bottles were positioned above the thermocline and 4 bottles below the thermocline. Samples from each group of 4 bottles were pooled together. In addition, a 5-gallon surface water sample was obtained at each cast and at several other locations.



Track Chart of Charles H. Gilbert Cruise 59 (July 23-August 15, 1962).

southwest of Christmas Island, returning there on August 6. During August 8-10, live-bait fishing was conducted along the Line Islands. Following departure from Palmyra Island on August 11 (the day after arrival there) bathythermograph casts were made, surface salinity samples collected, plankton tows were made, and drift cards

Collecting blood samples from tuna and marlins for serological studies was the fourth objective, as follows:

1. From up to 300 skipjack caught by live-bait fishing methods, blood was collected from 1. In addition, blood samples were obtained from 30 yellowfin obtained by live-bait fishing outside Palmyra Island, and from 1 yellowfin caught by trolling.
2. From all tuna and marlins caught by long-line fishing, blood samples were collected from the following long line-caught fish: 23 yellowfin, 9 big-eyed, 4 skipjack, 1 albacore, 1 wahoo, 4 marlin, and 1 sailfish.
3. Total blood samples collected: 54 yellowfin, 9 big-eyed, 5 skipjack, 1 albacore, 4 marlin, 1 sailfish, 1 wahoo.

Other details of the cruise were:

1. Bathythermograph casts and collections of surface salinity samples were made every 30 miles on runs between Honolulu and Christmas Island, between Palmyra Island and Honolulu, and also at long-line fishing locations.
2. Stomach contents of 25 long-line caught tuna and marlins were presented for studies at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu. Skeletons of 3 big-eyed tuna were retained for studies at the Bureau's Honolulu Laboratory.
3. The thermograph was operated continuously throughout the cruise.
4. Eight skipjack, 8 yellowfin, and 37 unidentified fish schools were sighted during the cruise.
5. One skipjack, 1 yellowfin, and 1 rainbow runner (*Elagatis bipinnulatus*) were caught by surface trolling.
6. Drops of drift cards (20 cards per drop) were made every hour for the first 6 hours after departure, and thereafter every 3 hours until 15° N. On the return trip, one group of drift

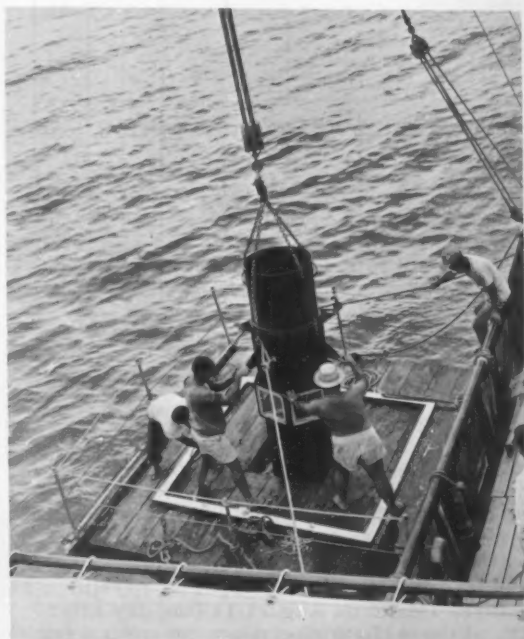
cards were dropped every hour commencing 4 hours from Honolulu.

Note: See Commercial Fisheries Review, September 1962 p. 16.

FISH BEHAVIOR NEAR FLOATING OBJECTS STUDIED:

M/V "Charles H. Gilbert" Cruise 60 - Koalana I (September 26-October 12, 1962): Observations during this cruise on the ecology and behavior of animal life in the vicinity of a floating object at sea were made jointly by the research vessel Charles H. Gilbert and the raft Nenu, both operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu. The area covered was in waters ranging up to 10 miles off the Kona coast of Hawaii between latitudes 19° and 20° N.

This first raft expedition, defined as Koalana I, was an experimental joint research project utilizing the raft so as to study the makeup and behavior of mixed fish communities which form under drift logs and other flotsam in the ocean. In addition to other related environmental observations the Gilbert which left her base at Kewalo Basin,



The underwater caisson being lowered on to the Nenu I from the mothership, Charles H. Gilbert.

Honolulu, on September 26 with the Nenu aboard acted as support vessel to the raft which drifted within 11 miles off the Kona coast during the cruise period.

A total of 106 man-hours of direct observation was made from the underwater ports of the raft, and 10 man-hours of direct observation from the underwater ports in the bow chamber of the Charles H. Gilbert while the vessel took samples and scouted for fish around the raft at distances of 1 and 2 miles.

The most common members of the fish community which formed under the raft were the nomeid (Psenes cyanophrys), the balistid (Canthidermis maculatus), and mahimahi (Coryphaena hippurus). Although the raft never drifted for more than 50 hours without having to be moved because of either drifting to shore or dangerously close to rough water, as many as 60 nomeids, 33 balistids, and 33 mahimahi were at times present. In addition, the following fishes were seen from the raft chamber: maomao (Abudefduf abdominalis), wahoo (Acanthocybium solandri), skipjack tuna (Euthynnus pelamis), opelu (Decapterus pinnulatus), pilotfish (Naukrates ductor), Kahala opio (Seriola aureovittata), a rare omaka (Caranx kalla), kaku (Sphyrna barracuda), whitetip shark (Carcharhinus longimanus), mobulids, istrophorids, mullids, and many unidentified fish.

Porpoises were also observed during this period. Behavior observations were made on as many of those species as possible. The permanence of a species' association to the raft was noted, and rates of accumulation for each species were recorded. Stomach samples and fish specimens were preserved whenever possible. A total of 1,600 feet of 16 millimeter film and 88 still pictures were taken from the raft's viewing ports, and of the general operation.

Depth casts and weather observations were made every 6 hours after the raft was in the water. A total of 44 fish schools were seen from the Charles H. Gilbert, and only one-half of those schools were accompanied by birds. Location and movement of fish schools relative to the raft's position were measured whenever possible.

Plankton was collected during the cruise for use in rearing tuna larvae. A total of 23 surface plankton hauls were made with the 1-meter net at 2 a.m. and 2 p.m. Very few

fish eggs were taken in night hauls. Although more fish eggs were taken in day hauls, the bulk of the catch consisted of crustacean eggs. Larvae were hatched from eggs of several fish species, but only a few of them were reared past the yolk sac stage. No tuna eggs were identified on this cruise. A total of 9 night-light fishing stations were also worked in order to catch young tuna for rearing in a shipboard aquarium. Only one tuna-like fish (Auxis sp.) was taken, and it died a few days later when the water circulating pump had to be turned off.

A total of 289 drift cards was released. These were released 10 at a time at each bathythermograph cast.

Note: See Commercial Fisheries Review, November 1962 p. 22.

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FISH BEHAVIOR STUDIED ON FIRST RAFT EXPEDITION:

A unique and quite unusual type of research craft, the raft Nenu, was brought back to Honolulu on October 12, 1962, after two weeks of scientifically productive drifting off the Kona coast of Hawaii. The expedition, designated Koalana I, was the first attempt in Hawaiian waters to make direct observations of the communities of fish and other marine animals which congregate under objects floating in the ocean.

Four scientists of the Bureau of Commercial Fisheries Biological Laboratory at Honolulu who were on the Nenu while she was drifting, were enthusiastic about the opportunities which the raft afforded for sustained study of the behavior and interactions of a variety of fish species. But they admitted that over 100 hours in the cramped observation capsule under the raft, concentrating on the circling fish while the 12-by-12 foot Nenu bobbed on the swells, had been a severe test of their stomachs' devotion to science.

The Laboratory's research vessel Charles H. Gilbert launched the Nenu about 10 miles off Kealahou Bay on September 27 and stood by within sight and walkie-talkie range of the raft at all times. The Nenu drifted north along the Kona coast unexpectedly fast, sometimes at 4 miles an hour. This resulted in the Charles H. Gilbert having to pick the raft up four times to keep it from drifting ashore or out into rough channel waters. A fish behavior specialist on the

expedition reported that each time the Nenue was placed in the sea, small fish began to be attracted to it within 5 or 10 minutes. The first fish arrivals were generally rudderfish,



The Nenue I adrift off the Kona Coast of the Island of Hawaii.

similar to the species nenu for which the raft was named. At times there were as many as 60 of that species under and around the raft. Small triggerfish (closely related to the familiar humuhumunukunukuapuaa) were also numerous and regular members of the fish groups following the raft.

Mahimahi (dolphin) were often about the raft, sometimes as many as 30 at a time. Those colorful, fast-swimming fish would come in under the Nenue and rub their sides against its oil-drum floats, then range out to the far periphery of the drifting fish community where, the scientists guessed they may have been picking off stragglers or intercepting new recruits attracted by the raft. The mahimahi mingled harmoniously with the triggerfish, but they voraciously harried a stray jack, similar to the akule, keeping it holed up under the raft for several hours. The jack finally escaped by joining the pilotfish escort of a passing whitetip shark.

From the windows of their observation capsule in the raft, the biologists also saw porpoise, marlin, manta rays, barracuda, opelu, wahoo (ono), and skipjack tuna (aku). With the exception of the wahoo, those fish gave no indication that their behavior was affected by the presence of the raft and remained in its vicinity only briefly. When the Nenue was moored to the anchored Charles H. Gilbert, with a strong current running by, it failed to attract even the rudderfish and triggerfish which were its almost constant companions when it was drifting free.

Preliminary consideration of the results of the expedition Koalana I points to several areas of possible scientific and commercial fisheries application. The raft Nenue's observers were aware of the regular use of rafts in the dolphin fishery of Japan, but they were unprepared for the rapidity with which considerable numbers of mahimahi gathered around their raft, particularly since it has commonly been thought that drift logs and other flotsam do not affectively attract large fish until they have been drifting long enough to accumulate a growth of seaweeds and a population of small invertebrate animals. The unexpectedly wide variety of fish species and large numbers of individuals seen from the Nenue offer some promise that floating observation posts could provide an additional and useful technique for estimating the abundance and composition of the fish resources of an area. There were some indications on expedition Koalana I of rather definite changes in the make-up of the raft's following as it drifted into different locations at varying distances from shore. If further observations show those changes to be regular ones, they should give new insights into the relations between some commercially-important fish and their environment.

Many of the observations made by the scientific raftsmen were recorded in still and moving pictures, and numerous specimens were collected for identification, and for examination of their stomach contents. Detailed analysis of the data collected, and of similar observations made from the underwater viewing chambers of the accompanying vessel Charles H. Gilbert at various distances from the raft will furnish a basis for more sharply focused experimental work on future voyages to be made by an improved raft.

Note: See Commercial Fisheries Review, November 1962 p. 22.

Fish Protein Concentrate

NATIONAL ACADEMY OF SCIENCES SPURS INTERIOR DEPARTMENT RESEARCH:

Conclusions by a National Academy of Sciences panel that "a wholesome, safe and nutritious product can be made from whole fish" has given the U. S. Department of the Interior a "green light for accelerated research into manufacture of fish protein concentrate (FPC), a new source of food for the world's hungry," Secretary of the Interior Stewart L. Udall reported on November 8, 1962.

Fish protein concentrate is made by reducing fish to a fine white powder or a liquid by chemical, enzymatic, or other means. The resulting product can be added to any foods. By utilizing the unharvested catch of fish in United States waters alone, a sufficient quantity of animal protein could be produced to supplement deficient diets of one billion people for 300 days at a cost of less than one-half cent per person per day, Secretary Udall reported. Most of those fish today are not commercially marketed.

On the request of Secretary Udall, the National Academy of Sciences appointed a seven-man panel to study the safety, wholesomeness, and nutritional features of fish protein concentrate as well as other questions related to its potential.

The report, sent to Secretary Udall by Dr. Frederick Seitz, Academy president, stated in part:

"The committee concluded that a wholesome, safe, and nutritious product can be made from whole fish. The committee accepted the definition of a 'wholesome product' to be a product which is healthful and promotes physical well-being. It stressed the necessity of maintaining high standards in the preparation of the concentrate."

While stating that there is no immediate nutritional need for such a product in the United States, the committee held that it would be of "great value in meeting food problems presented in times of emergency or by expanding world population."

Commending the Academy for its carefully considered opinions on a matter of highest importance to meeting the nutritional problems of the world, Secretary Udall said:

"The United States, through research conducted by the Bureau of Commercial Fisheries, has assumed leadership in providing this lifeline of the future to the world's undernourished. It is estimated that in the United States coastal waters alone, fishermen could harvest for fish protein concentrate purposes over 7 billion pounds of fish annually without disturbing the brood stock necessary to assure continued harvests. Many of these fish today have little or no commercial value."

The "desperate need" for a low-cost source of animal protein is evidenced, Secretary Udall said, in the fact that studies show "approximately two billion of the world's population now suffer from protein lack."

"FPC, which keeps indefinitely and is easily transportable to the most remote areas, can meet this need and at the same time provide limitless economic benefits to the commercial fishing industry," he added.

Secretary Udall said that he would give "the highest priority" to a program of accelerated research on FPC. Legislation providing about \$500,000 for such a program was lost when the supplemental appropriations bill was not enacted.

The National Academy of Sciences panel conducting the survey included: W. H. Sebrell, Jr., M.D., Institute of Nutrition Sciences, Columbia University; James B. Allison, Ph.D., Bureau of Biological Research, Rutgers University; Grace A. Goldsmith, M.D., School of Medicine, Tulane University; Harold Humphrey, B.S., Consultant in Food Tech-

nology, UNICEF; H. S. Olcott, Ph.D., Institute of Marine Resources, University of Calif., Berkeley; M. B. Schaefer, Ph.D., Institute of Marine Resources, Scripps Institute of Oceanography, La Jolla; R. E. Shank, M.D., School of Medicine, Washington University.

The report concluded: "Until a suitable and acceptable fish protein concentrate product can be made available commercially, the committee is of the opinion that there should be no consideration of a definition and standard of identity under the Food, Drug, and Cosmetic Act and that the postponement of public hearings in the matter should be continued indefinitely. Unduly restrictive regulations and judgments as to the wholesomeness, safety, and nutritive value should not be made during the period of research on and development of new and possibly valuable food products, such as fish protein concentrates. Such actions constitute a serious handicap tending to discourage research and development initiative.

"The committee recommends that government agencies as well as private industries be encouraged to pursue basic and developmental research with the assurance that new wholesome, safe, and nutritious food products resulting therefrom will be made available to consumers without prejudice:

"The United States is blessed with an abundance of food and, through research, has attained preeminence in food production and technology. In order to maintain leadership, broadly based and continuing research, with the freedom essential thereto, is an absolute necessity. Although there may be no demonstrable nutritional or economic need at the present time by the people of the United States for a fish protein concentrate, the committee reemphasizes its opinion that the public should not be denied the availability of safe and nutritious new products, and American industry should not be deterred from the research necessary to making such products available. The production of good foods economically should be encouraged by all means, and especially the development of procedures for the most complete and effective use of protein resources should be commended."



Fur Seals

FIVE FIRMS SEEK UNITED STATES GOVERNMENT SEALSKIN PROCESSING CONTRACT:

Five firms, one of them in London, England, met the November 1, 1962, deadline for submitting proposals for processing and selling Alaska sealskins for the United States Government, the U. S. Department of the Interior announced on November 5.

The Department stated that no contract will be awarded until the various proposals have been carefully evaluated and that it will be some time in 1963 before negotiation of a new contract can proceed. There are two phases to the evaluation: The first phase relates to the quality of work which the prospective contractor can produce and the second requires proof of his ability to fulfill the requirements of a contract. The U. S. Bureau of Standards will make physical and chemical tests of the sealskins submitted with the pro-

posals. A panel of consultants will also make separate, subjective evaluations. The invitation for proposals to handle the sealskins for the Government follows last winter's announcement that the Department of the Interior was cancelling its contract with the Fouke Fur Company of St. Louis on December 31, 1962. The Fouke Fur Company has processed the skins for many years.

As a basis for a new contract, the Fish and Wildlife Service's Bureau of Commercial Fisheries--the agency charged with managing the Alaska fur seal resource--issued on June 20, 1962, a prospectus for processing and selling these skins. The prospectus listed four steps in the specifications--preliminary processing of the sealskins on the Pribilof Islands, processing the skins from the cured stage to the finished luxury skin, developing the market, and selling the finished skins at public auction. This prospectus was distributed to all interested firms and individuals. Raw skins were supplied to 11 firms and individuals for use in developing an adequate process.

Note: See *Commercial Fisheries Review*, August 1962 p. 92.



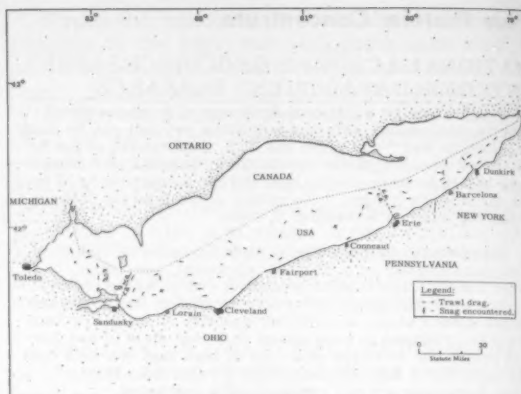
Great Lakes Fisheries

Exploration and Gear Research

TRAWL FISHING INVESTIGATION IN LAKE ERIE:

M/V "Kaho" Cruise 4 (September 23-October 10, 1962): To obtain additional seasonal information concerning the depth and geographic distribution of various fish stocks and their availability to commercial-type bottom trawls were the primary objectives of trawl fishing operations in Lake Erie during this 4-week cruise by the exploratory fishing vessel Kaho of the U. S. Bureau of Commercial Fisheries.

A total of 62 drags was made during this cruise--18, 37, and 7 in the eastern, central, and western basins of Lake Erie. All drags lasted 30 minutes except 2 which snagged on bottom obstructions and 2 that were terminated when sets of trap nets or gill nets were encountered. The two hang-ups caused considerable gear damage. Standard 50-foot (headrope) Gulf of Mexico-type semiballoon trawls equipped with Western-style foot-rope were used.



Lake Erie explorations by M/V Kaho on Cruise 4 (September 23-October 10, 1962.)

Smelt catches of commercial significance were made only in the eastern basin of Lake Erie at depths greater than 75 feet. Three drags off Dunkirk, N. Y., yielded 200, 380, and 490 pounds each; five drags off Barcelona, N. Y., accounted for 150, 300, 450, 480, and 600 pounds each; and off Erie, Pa., three drags yielded 120, 150, and 1,125 pounds each.

Incidental catches during the cruise consisted of 4 catches (115 to 363 pounds) of large yellow perch from 5 fathoms of water in the western basin, 5 catches (95 to 225 pounds) of carp in the central and western basins, and two night catches of (92 pounds each) sheepshead in the central basin. Although fair showings of alewife and gizzard shad were noted in the central and western basins, concentrations available to the bottom trawl were not considered heavy enough to support a fishery.

Young-of-the-year yellow perch were found in heavy concentrations in depths of 11, 12, and 13 fathoms from Erie, Pa., to Vermilion, Ohio. A small-mesh (1-inch stretched measure) cod-end liner accounted for large catches (52 to 1,020 pounds) made in 10 drags. Changing the mesh size was effective in reducing catches of small fish. Young-of-the-year yellow pike were caught in moderate numbers in 12 drags just east and west of the main island group.

Mesh-size selectivity in relation to yellow perch was studied with the aid of a "trouser leg" cod end (a means of fishing two cod ends with different mesh size simultaneously on one net). Although additional data is needed to verify the findings, cod-end mesh sizes of

Lake Erie Trawl Explorations by M/V Kaho During Cruise 4

Area	Depth Range (Feet)	No of Drags	Catch Rate (Pounds Per Hour)		Species Composition	
			Range	Average	Species	Percentage of catch
Western Basin	21 to 30	7	8 to 1,554	914	Yellow perch (over 8")	35
					Yellow perch (4" to 8")	21
Central Basin	30 to 49	3/8	100 to 950	377	Yellow perch (under 4")	1/Tr.
					Carp	18
					Alewife	12
					Gizzard shad	5
					Sheepshead	5
					Other species ^{2/}	4
	50 to 74	4/15	66 to 2,116	645	Yellow perch (over 8")	8
					Yellow perch (4" to 8")	5
					Yellow perch (under 4")	1
					Carp	33
					Gizzard shad	20
Eastern Basin	75 to 84	8	40 to 710	198	Smelt	18
					White bass	7
					Other species	8
	60 to 74	5	52 to 178	94	Yellow perch (over 8")	8
					Yellow perch (4" to 8")	5
					Yellow perch (under 4")	70
					Sheepshead	5
					Other species	12
	75 to 99	4	182 to 1,208	707	Yellow perch (over 8")	31
					Yellow perch (4" to 8")	10
					Yellow perch (under 4")	17
					Sheepshead	31
					Alewife	6
Eastern Basin	100 to 124	6	72 to 2,284	946	Other species	5
					Yellow perch (over 8")	5
					Yellow perch (4" to 8")	Tr.
					Yellow perch (under 4")	7
					Smelt	42
	125 to 149	3	242 to 602	382	Carp	20
					Yellow pike (walleye)	9
					White bass	7
					Alewife	6
					Other species	4
Eastern Basin	75 to 99	4	182 to 1,208	707	Yellow perch (all)	1
					Smelt	Tr.
					Other species	13
					Yellow perch (all)	85
					Smelt	1
	100 to 124	6	72 to 2,284	946	Yellow perch (all)	1
					Smelt	98
					Other species	1
					Yellow perch (all)	1
					Smelt	99
					Other species	0

1/"Tr." = Less than 0.5 percent.

2/"Other species" includes those that individually amounted to less than 5 percent.

3/Four other drags, resulted in gear damage, were stopped to avoid set nets, or otherwise malfunctioned.

4/Two other drags, either resulted in gear damage or were stopped to avoid set nets.

2½-inches and 2¾-inches caught few yellow perch smaller than 8 inches. The 2¼-inch and 1½-inch mesh sizes yielded increasingly greater proportions of younger yellow perch age groups.

Day-night fishing on a 14-fathom drag site off Cleveland yielded better catches at night. The main difference was caused by the presence of 92 pounds of sheepshead in each of two night drags, while comparative daytime drags contained 16 and 17 pounds of that species. Large yellow perch, the only other fish present in significant amounts in

the area, were caught more readily during mid-morning hours.

Surface temperatures ranged from 57° F. to 63° F. in the eastern basin of Lake Erie, 61° F. to 65° F. in the central basin, and 59° F. to 61° F. in the western basin.

Note: See Commercial Fisheries Review, October 1962 p. 15.



Great Lakes Fishery Investigations

LAKE ERIE FISH POPULATION SURVEY CONTINUED:

M/V "Musky II" (September 1962): The Lake Erie fish population survey was continued in September by the U. S. Bureau of Commercial Fisheries research vessel Musky II. Operations in September included routine fishery and limnological observations at five stations in the western basin of Lake Erie. Two of the stations were visited twice during the month. Also, the vessel made trips to another two areas in the central basin to determine the extent and duration of oxygen deficiencies in deep water. Oxygen deficiencies in those areas were observed for the first time about the latter part of August 1962 in the deeper areas of the central basin off Lorain, Ohio.

Species and sizes of fish caught in bottom trawls were fairly consistent and uniform at different stations. The hauls averaged 821 fish for each 10-minute tow in Sandusky Bay and 765 fish in the open lake. In both the bay and lake, young-of-year fish made up about 85 percent of the catch. Somewhat fewer young white bass and yellow pike were caught than during previous months, probably because of greater escapement related to increase of size.

The growth of most young-of-year fish continued to be mediocre. Average total lengths in inches at the end of September 1962 were: yellow perch, 2.9; yellow pike, 8.6; white bass, 3.2; sheepshead, 4.4; smelt, 2.5; gizzard shad, 3.8; alewife, 4.6; spottail shiner, 2.7; trout-perch, 3.1; and emerald shiner, 2.6.

In mid-September, critically low dissolved oxygen remained in depths over 60 feet at one of the stations off Lorain. Limited numbers of trawl tows, made in conjunction with the water chemistry, yielded few fish as compared to similar tows earlier in 1962 in the same area and depth. The lower numbers of fish and low oxygen appeared to be directly correlated.

Surface water temperatures in the western basin of Lake Erie were 74° F. at the beginning of the month. Strong winds and decreasing air temperatures brought about a rapid and continuous decrease, down to an average of about 60° F. by late September. That change in temperatures was accompa-

nied by an increase in the numbers of smelt in the western portion of the lake.

Commercial landings of yellow perch by Ohio fishermen showed signs of increasing during September. How long the good catches would continue was difficult to estimate because it was not known how long the dominant 1959 year-class of that species would support the fishery. Yellow perch of the 1960 year-class were found to be fewer in number and were growing more slowly than fish of the 1959 year class.

Note: See Commercial Fisheries Review, October 1962 p. 18.

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DREDGE PERFORMANCE TESTED FOR BOTTOM STUDIES IN SOUTHERN LAKE MICHIGAN:

M/V "Cisco" Cruise 8 (September 18-October 1, 1962): A comparison of (1) the performance and relative efficiency of various types of dredges for bottom sampling and (2) the collection of data on the distribution of bottom organisms at different water depths and in different sediments, were the major objectives of this cruise in southern Lake Michigan by the U. S. Bureau of Commercial Fisheries research vessel Cisco. Three samples were taken with each dredge at depths of 3, 10, 20, 30, and 40 fathoms off South Haven and St. Joseph, Mich., and Chicago and Waukegan, Ill. Samples were also taken at 8 fathoms off Racine, Wis. The Racine reef was selected for sampling in order to observe dredge performance in hard clay, gravel, and rock.

Studies conducted on this cruise were originally planned in 1960, when sampling off Grand Haven, Mich., with a Smith-McIntyre dredge (borrowed from the Bureau's Woods Hole Biological Laboratory) and a Petersen dredge showed that the two samplers were not performing equally at depths greater than 20 fathoms. The number of bottom organisms taken by the Petersen dredge decreased as the depth range increased from 20 to 50 fathoms, whereas the number taken by the Smith-McIntyre dredge being tested remained about the same. The orange-peel type dredge was included in the cruise 8 study because much previous sampling in gravel and hard sediments had been with that type of dredge.

A brief examination of the samples collected during the cruise indicated that sediment type at the various depths, rather than

the depth itself, probably determines the sampling efficiency of the dredges.

Bathythermograph casts were made at 1-mile intervals on a transect between Milwaukee, Wis., and Grand Haven, Mich., as part of a study of internal waves in Lake Michigan conducted by the Director of the Scottish Marine Laboratory who was then at the University of Wisconsin.

During the latter part of cruise 8, a large-mesh (No. 1558 "Nitex"), 1-meter, nylon plankton net was towed at speeds up to about 7 knots per hour to attempt to collect small fish. One 20-minute oblique tow from the surface down to 4 fathoms, over a 5-fathom bottom, yielded 41 fingerling alewives, but no other fish were caught.

The M/V Cisco was under contract to the U. S. Public Health Service during cruise VII (August 28-September 11). On that cruise, limnological and bacteriological samples were collected at 69 stations at the 1-, 4-, 7-, and 10-mile contours between Milwaukee and Chicago. No report on that cruise will be issued by the Bureau's Ann Arbor Biological Laboratory.

Note: See Commercial Fisheries Review, October 1962 p. 18.

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LAKE TROUT DISTRIBUTION STUDIES IN WESTERN LAKE SUPERIOR CONTINUED:

M/V "Siscowet" Cruise 7 (September 24-October 9, 1962): Environmental conditions were studied at three limnological stations in the Apostle Islands region of Lake Superior during cruise 6 of the research vessel Siscowet (operated by the U. S. Bureau of Commercial Fisheries). Collections included records of water temperatures, Secchi disc readings, water samples for chemical analyses, and bottom and plankton samples. Water temperatures ranged from 50° to 55° F. at the surface, dropped from 55° to 41° F. in the stratum of water between about 10 and 15 fathoms, and were 40° F. at depths of 50 fathoms or more. Plankton abundance was relatively high at all stations.

Trawl tows at depths ranging from 10 to 30 fathoms, and experimental gill nets (1- to 5-inch mesh, by $\frac{1}{2}$ -inch intervals) set at 22 fathoms yielded a total of 269 young lake trout. Of that total, 264 (98 percent) were fin-clipped fish. Nearly all of the lake trout were caught at depths between 20 and 25

fathoms. Lake trout from the 1961 and 1962 Bayfield plants were most common in the catches.

Trawling during and immediately after release of about 16,000 hatchery-reared lake trout from shore at Frog Bay revealed that the fish reached a depth of 10 fathoms in slightly over 1 hour after planting. Earlier observations by the Siscowet on previous cruises showed that lake trout planted in the spring required $2\frac{3}{4}$ hours to reach that depth. The fall-planted fish were larger (8.5 fish to the pound) than those planted in the spring (22 to the pound). This was believed might be the reason for their faster movement to deep water.

In an effort to learn some of the factors which may affect the depth distribution of young lake trout, a $\frac{1}{2}$ -meter plankton net was towed along the bottom at various depths between 10 and 30 fathoms. Zooplankton (predominately copepods), Pontoporeia, and Myx were most abundant at 20-25 fathoms, but were relatively scarce at depths above 20 and below 25 fathoms.

Chubs (Coregonus hoyi) were common in nearly all the trawl catches. One 15-minute tow at 20 fathoms yielded a total of 711 fish of that species weighing 165 pounds. Other species in the catches included small numbers of smelt, sticklebacks, and sculpins.

Note: See Commercial Fisheries Review, November 1962 p. 24.



Gulf Exploratory Fishery Program

SHRIMP MARKING STUDY IN GULF OF MEXICO:

M/V "George M. Bowers" Cruise 40 (July 6-19 1962): The catching, staining and release of brown shrimp (Penaeus aztecus) was the main objective of this cruise by the gear research vessel M/V George M. Bowers of the U. S. Bureau of Commercial Fisheries. Cruise 40 which was made jointly with the Bureau's Galveston Biological Laboratory, was the initial phase of a continuing study to obtain a preliminary estimate of the growth, mortality and migration patterns of brown shrimp.

The vessel operated in two general areas. In the area off Grand Isle, La., a total of 2,370 shrimp were marked with fast green

dye and released in a depth range of 12 to 17 fathoms. In the other area off the northern Texas coast, some 3,000 shrimp were marked with a Trypan blue dye and released in $4\frac{1}{2}$ to 9 fathoms. Recoveries of marked shrimp from the first release off the Louisiana coast were reported as being very high.

Note: See Commercial Fisheries Review, November 1962 p. 24, and August 1962 p. 26.

ELECTRICAL FIELD EXPERIMENTS AND SHRIMP BURROWING BEHAVIOR OBSERVATIONS IN GULF OF MEXICO:

M/V "George M. Bowers" Cruise 41:

Electrical field strength experiments and a continuation of studies on the behavior phase of the shrimp gear research project in the Gulf of Mexico were conducted in St. Andrews Bay, Fla. (off Panama City), during this cruise by the U. S. Bureau of Commercial Fisheries gear research vessel George M. Bowers. The vessel operates from the Gulf and South Atlantic Exploration and Gear Research Base at Pascagoula, Miss., where she returned on August 31, 1962.

Electrical Field Strength Experiments:

Experiments to determine the shape and magnitude of an a.c. electrical field between two electrodes in sea water were conducted on this cruise. Three sizes of brass electrodes were tested (3' and 6' $\frac{1}{8}$ " rod and 3' $\frac{3}{4}$ " rod). Currents tested were 1 amp, 3 amps and 6 amps. Voltage potentials were measured in predetermined planes surrounding the electrodes with a vacuum-tube voltmeter. In addition, $\frac{3}{32}$ " stainless steel cable electrodes were also tested and the following factors were investigated: (1) The field above the electrodes, (2) the field below the electrodes when they are at an angle to the bottom, (3) the electrodes at right angles, and (4) various frequencies from 60 to 50,000 cycles per second.

Data collected on this trip are being evaluated. An apparent significant increase in voltage drop with an increase in frequency was of interest.

Burrowing Observations: Observations were continued to determine the burrowing behavior of shrimp. During the observation period, the moon was at or near-dark and generally the shrimp remained out of the bottom the entire night. This was in contrast to observations during the full moon when they remained out for only a few hours.

These observations are to be continued using time-lapse cameras and a photometer in an attempt to determine whether light level, moon phase, or both are contributing significantly to this behavior.

Response To Electrical Stimulus: Experiments to evaluate the power level needed to bring about a significant response were undertaken. It was observed that frequently with shrimp in identical positions relative to the electrodes, that a given power level produced a very strong response in some animals but a very weak response in others. Possible reasons for this include: (1) The physiological condition at different molting stages, (2) the physiological condition as a result of trawl capture and tank holding or, (3) a combination of the two.

Instrumentation Development: Performance of instruments on this cruise was as follows:

1. The load cell system was tested on a 40-foot trawl and performed well electrically.
2. The door angle of attack recorder performed well mechanically.
3. The bottom speed indicator functioned well but a magnetic counter was indicated rather than the mechanical one used.
4. The bathygraph units were tested and found satisfactory.



Gulf Fishery Investigations

Some of the highlights of studies conducted by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries during July-September 1962:

SHRIMP FISHERY PROGRAM: Shrimp

Spawning Populations: Brown shrimp ovaries taken off Galveston in 15 and 25 fathoms during January-June 1962 were examined. Comparison between 1961 and 1962 ovary samples shows that a much larger percentage of ripe and recently-spent females occurred in 25 fathoms in 1962. The converse was true for 15-fathom samples. The percentage of ripe and recently spent ovaries from 15 fathoms was much greater in 1961. A large proportion of the brown shrimp females from 15 fathoms in 1962

were young with ovaries either undeveloped or in early developmental stages.

During July-September 1962, six research cruises were completed in which 175 one-hour hauls were made with a 45-foot flat shrimp trawl.

There were 35,905 penaeid shrimp taken, of which 12,857 or 35 percent were commercial species. About one-third of the catch consisted of rock shrimp (*Sicyonia brevirostris*), a species not now exploited. The catch per unit of effort for adults of all species increased with an increase in longitude in much the same manner as the penaeid larvae.

Migrations of Brown and White Shrimp: Of the 2,431 stained and 1,690 tagged shrimp released off the Texas coast in April 1962, 144 stained shrimp and 61 tagged shrimp had been recovered by the end of the third quarter 1962.

The movement of the stained shrimp was random in relation to the Texas coast and more than 92 percent of the recoveries were captured less than 30 miles from the center of the staining area. Tagged shrimp slightly northeast of Port Aransas moved in a southerly direction, while shrimp released south of Port Aransas moved mostly in a northerly direction. One shrimp traveled about 68 miles in a northeasterly direction. None of the tagged shrimp released off Freeport traveled more than 15 miles. The data indicate no significant immigration of large adult shrimp from adjacent areas into the staining area, nor any significant emigration of shrimp from the staining area into adjacent areas.

Two mark-recapture experiments designed to obtain estimates of fishing mortality and other parameters on the brown shrimp stocks were initiated during July 1962. A total of 2,370 stained shrimp, including three different size groups, was released off Grand Isle, Louisiana, and 2,973 stained shrimp of two different size groups was released off Galveston, Tex. In addition, a preliminary estimate of the number of nonrecoveries was obtained for the Golden Meadow-Grand Isle area during July. A total of 623 shrimp had been recovered by the end of the third quarter from the Louisiana experiment, and 69 recoveries had been returned from the Galveston experiment.

During the quarter, 72 stains, pigments, and fluorescent dyes were tested to determine their suitability as primary or secondary marking agents on penaeid shrimp. Two of the stains, Bates numbering inks blue and green, tested as primary marks retained sufficient color in the gills to be considered useful as marking agents for short-term experiments.

The movement of Sanford's checkwriter inks, red, blue, and black, from the site of injection into the gill area where they mask the primary stain definitely limits the suitability of those inks as secondary marks.

A number of fluorescent pigments used as secondary marks have proved successful when used with the primary stain, fast green FCF. These pigments are easily detected and differentiated under ultraviolet light. No fading or shedding was observed at the end of 84 days. Since those pigments can be localized at the site of injection, the number of secondary marks can be increased by varying the injection site.

Bait Shrimp Fishery: Bait shrimp production in the Galveston Bay system increased in July and August 1962 as compared with the same months of 1961. However, species composition percentages indicate that juvenile brown shrimp left the Bay earlier this year than in 1961. Substantial offshore catches of brown shrimp too small to meet the required 50 count (heads-off) per pound in July, August, and the first part of September would seem to support this conclusion.

Shrimp Larval Studies: During the quarter 222 plankton samples were examined for penaeid larvae. These were collected during January-April 1962 at the 60 monthly stations between the Mississippi River and Brownsville, Texas. The data show that the relative abundance of penaeid larvae increased with an increase in longitude, i.e. moving east to west. Statistical areas 13-15 had a relatively low larval abundance. In areas 16-18 penaeid larvae were slightly more abundant and were found to be most abundant in statistical areas 19-21.

In all statistical areas penaeid larvae were more abundant in the 20-40 and 40-60 fathom depth zones than in the 0-20 fathom zone.

Larval stages consisted primarily of protozoa, mysis, and postlarva. Very few

nauplius stage shrimp were taken, an indication that spawning activity was reduced during January-April 1962.

Commercial Catch Sampling: It was reported by fishermen in July and August 1962 that large quantities of undersized shrimp (Texas law) were being discarded at sea. In mid-August a 10-day trip was made on a commercial shrimp boat to make observations on the amount of discard relative to the amount of shrimp retained. Culling ranged from 0 to 64 percent of each haul with 74 percent of the total catch being marketable. According to the captain of the boat this was an improvement over the preceding month when up to 75 percent of the catch was discarded because of size.

Measurements of tail and total length and conversion charts were completed for brown and white shrimp.

The landings of 387 vessels were sampled for size and species composition. In this work nearly 40,000 shrimp were examined of which 84 percent were brown shrimp, 14 percent white shrimp, and 2 percent pink shrimp.

Migrations of Pink Shrimp: A mark and recapture experiment designed to give additional information on the geographic distribution of the Tortugas shrimp population was initiated near Indian Key, Fla. Between August 27 and September 5, 1962, a total of 19,860 pink shrimp were marked with trypan blue and released.

Two pink shrimp marked on the Sanibel grounds in March 1962 were recovered near the northwest border of the Tortugas grounds. They had traveled about 82 nautical miles in 115 days. These recoveries were the first indication of movement between the two fishing grounds. No Tortugas marked shrimp have been taken on the Sanibel grounds.

The returns from the Sanibel experiment are complete with 563 (22 percent) of the 2,496 marked shrimp having been returned as of September 21, 1962. Growth data from this experiment indicate an average increment of 2.4 mm. per month for females and 1.3 mm. per month for males.

Study of the relative abundance and distribution of larvae of the pink shrimp (*Penaeus duorarum*) on the Tortugas Shelf of

the Gulf of Mexico was continued by the Institute of Marine Science University of Miami, under a contract with the U. S. Fish and Wildlife Service.

Plankton collecting trips were made to the Tortugas Shelf (4) and to Buttonwood Canal (4) using a Gulf V plankton sampler in the former area and a plankton pump in the latter. Considerable time during the quarter was occupied with purchasing and assembling equipment for the year's work.

During the quarter pink shrimp were twice reared from egg to postlarvae in the laboratory. The successful rearing through metamorphosis confirms earlier conclusions regarding pink shrimp development, which were partly based on stages of larvae found in the plankton.

BEHAVIOR PROGRAM: Effect of Temperature and Salinity on Growth and Survival of Estuarine Species: The acquisition of automatic temperature recording equipment has made it possible to study the behavior of small shrimp in vertical temperature gradients. Although the experimental apparatus employed was identical to that used in testing shrimp responses to salinity gradients (previously reported), the results obtained were strikingly different. While shrimp demonstrated a marked behavioral response to salinity gradients (avoiding salinities above 35 parts per thousand), most of these animals have been found to be incapable of avoiding lethal low temperatures in temperature gradients. Thus 32 of 37 shrimp tested became immobilized through cold narcosis before the end of the 25-minute observation period.

While it is too early to postulate the relative ecological significance of salinity and temperature to small shrimp, the present findings show that under comparable conditions these animals are more responsive in terms of linear movement to salinity than to temperature.

Results of a 24-hour survival study of shrimp grown from postlarval to juvenile size strongly support our previously reported suggestion that juvenile ($1\frac{1}{2}$ -inch total length) brown shrimp can tolerate considerable changes in temperature and salinity. The over-all survival was excellent (95 percent). The high level of survival in this experiment becomes even more

striking when we note that the temperature and salinity changes were immediate, providing the animals no opportunity for gradual acclimation.

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Analysis of 5 years of hydrological, meteorological, and biological data from the Galveston Bay estuarine system has been initiated. Analysis will include a comparison of the relative value to the fishery of four separate areas within the system.

Field sampling in the Galveston Bay system has been temporarily reduced in scope pending a preliminary review and examination of results from the past 5 years. A modified field program is being developed that will supplement and enhance the previous work.

Effects of Engineering Projects: During the quarter, 36 appraisals were made of engineering projects potentially affecting Texas estuarine fishery resources under the present system of coordination with the Branch of River Basin Studies. The majority of these resulted from the more than 109 Corps of Engineers public notices and letters received during the quarter and screened to determine which projects could materially affect estuarine areas, and consequently marine fishery resources. Portions pertaining to these fishery resources in 13 Bureau of Sport Fisheries and Wildlife draft reports were reviewed for concurrence or recommendations.

INDUSTRIAL FISHERY PROGRAM: Preliminary analysis of fish samples collected from waters off the Texas and Louisiana coasts from January through August 1962 had been completed by the end of the third quarter. Consistent trends can be seen in both the distribution and abundance of major species in spite of the fact that a relatively small number of samples are used to characterize this wide geographic area (monthly 5-lb. samples from each of 60 stations). No adequate measure of the absolute abundance of fish is available but, in general terms, it can be said that biomass appears to decrease as one proceeds westward from the Mississippi Delta or from the shoreline toward deeper waters. For the most part, these changes in biomass can be attributed to the distribution of individual species. A series of curves which relate the relative abundance of a species with

depth or distance from shore have been constructed. These, when used in conjunction with a measure of the contribution to the total catch made by each species, provide an approximate description of abundance.

Variation in the species composition of trawl catches taken from a given area has been recognized in the literature by several authors. This type of variation is sometimes extreme, i.e., a particular species may either dominate or be virtually absent from trawl hauls made in the same locale. Clarification of such marked variation is necessary before either sampling data or commercial statistics can be related to the actual fish stocks available in an area. A first step in this direction was made during a cruise in June when stations were sampled at 3-hour intervals over 24-hour periods. Information gained at that time indicated that the greatest single source of variation was associated with the diurnal periods of activity of the species involved. Several species, heretofore considered to be demersal, were found to be liable to capture by the trawl during approximately half of each 24-hour period. A second, more extensive, cruise which will employ both bottom and midwater trawls is planned in order to investigate this question more thoroughly. Since several other sources of variation may tend to mask the results of the field program, the question will also be pursued under laboratory conditions. An outdoor tank, measuring 18 feet in diameter and 16 feet in depth, has been fitted with a total of 10 portholes at various depths. It is expected that an observer situated outside the tank will be able to photograph or otherwise record the relative position of each species of fish over 24-hour periods.

The industrial trawl fishery in the northern Gulf is composed of two distinct fleets. Vessels in the East Gulf fleet fish east of the Mississippi River Delta from Pass a Loutre, La., to Gulf Shores, Ala., are usually less than 60 feet in length, and have an average capacity of about 30 tons. The West Gulf fleet generally fishes west of the Delta from Southwest Pass to Ship Shoal, La., and is made up of vessels more than 60 feet long with an average capacity of about 90 tons.

Relative fishing effort between the two fleets was calculated from 363 trips between April and September 1962. About 93

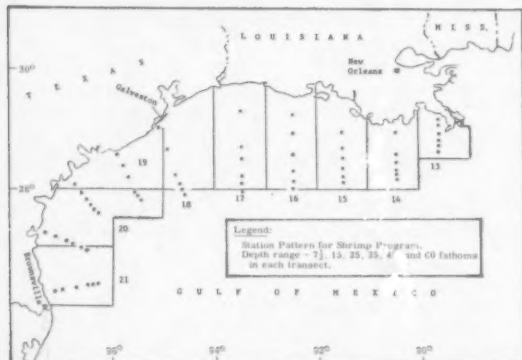
percent of the effort by both fleets occurred within the 10-fathom curve. The most concentrated efforts by vessels of the East Gulf took place in an area of about 300 square miles east of the entrance to Mobile Bay, Ala. Grounds of most importance to the West Gulf fleet lay immediately off Barataria Bay, Timbalier Bay, and Terrebonne Bay, occupying about 400 square miles of Louisiana coastal waters.

Work continues on collecting and reading scales and otoliths of Atlantic croaker, spot, and sand sea trout.

Note: See Commercial Fisheries Review, June 1962 p. 19.

SHRIMP DISTRIBUTION STUDIES:

M/V "Belle of Texas" Cruise BT-29 (October 16-27, 1962): Four statistical areas were covered on this cruise by the research vessel Belle of Texas, and a 45-foot shrimp trawl was used. One 3-hour tow was made in each of the 3 depth ranges in each area. The vessel (operated by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries in studying the distribution of shrimp in the Gulf of Mexico) returned to her home port on October 27.



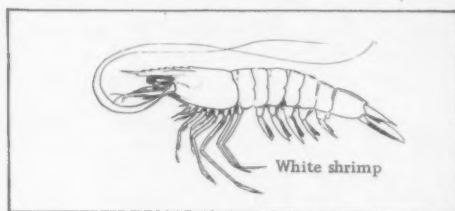
Shows the station pattern for Cruise BT-29 of the M/V Belle of Texas, October 16-27, 1962.

Catches of brown shrimp were very small at all depths except 0-20 fathoms in areas 18 and 19. The largest total catch of any area was in area 21 which yielded about 28 pounds, most of it large brown shrimp counting 12-15 to the pound from 20-40 fathoms. Catches in other depths of that area were small, and included a scattering of white and pink shrimp.

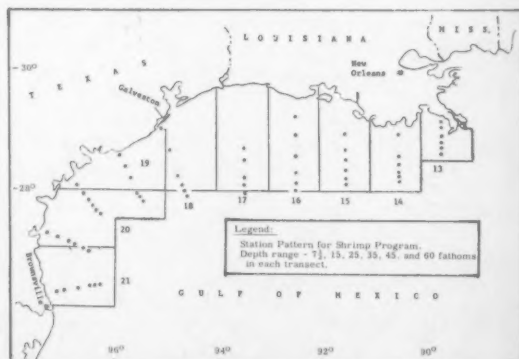
A total catch of about 20 pounds from area 20 was made up of 12 pounds of 21-25 count brown shrimp from the 20-40 fathom depth, and 6 pounds of 31-40 count brown shrimp from 0-20 fathoms. A small amount of 12-15 count brown shrimp and some 21-25 count white shrimp were also caught in that area.

M/V "Belle of Texas" Cruise BT-30 (October 27-30, 1962): Shrimp catches were relatively good in 2 of the 4 statistical areas worked by the Belle of Texas during this 4-day cruise. A 45-foot shrimp trawl was used, and one 3-hour tow was made in each of the 3 depth ranges.

Areas 16 and 17 yielded an average of 40 pounds each, mostly large brown shrimp counting 9-20 to the pound. A total of 16 pounds of smaller brown shrimp counting 26-30 were caught at 0-20 fathoms in area 16.



In area 14, shrimp counting 31-40 to the pound were caught at 0-20 fathoms--11 pounds were white shrimp and 6 pounds brown shrimp. Brown shrimp caught at other depths in that area counted 12-15 to the pound.



Shows the station pattern for Cruise BT-30 of the M/V Belle of Texas, October 27-30, 1962.

Area 15 accounted for 25 pounds of brown shrimp ranging from 21-30 count caught at depths up to 40 fathoms, and a small amount of larger shrimp from deeper water.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See *Commercial Fisheries Review*, November 1962 p. 26.



Industrial Fishery Products

FISH MEAL, OIL, AND SOLUBLES:

U. S. Production, September 1962: Preliminary data on U. S. production of fish meal, oil, and solubles for September 1962

U. S. Production ^{1/} of Fish Meal, Oil, and Solubles, September 1962 (Preliminary) with Comparisons				
Area	Meal	Oil	Solubles	Homogenized ^{3/}
	Short Tons	1,000 Gallons	.. (Short Tons) ..	
September 1962:				
East & Gulf Coasts ..	29,808	3,902	11,088	-
West Coast ^{2/} ..	2,090	70	1,532	-
Total	31,898	3,972	12,620	-
Jan.-Sept. 1962 Tot.	239,840	26,220	50,843	6,570
Jan.-Sept. 1961 Tot.	248,645	28,620	82,071	9,532

^{1/}Does not include crab meal, shrimp meal, and liver oils.
^{2/}Includes Hawaii, American Samoa, and Puerto Rico.
^{3/}Includes condensed fish.

as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in table 1.

During September 1962, a total of 31,200 tons of fish meal and scrap and 4 million gallons of marine-animal oils were produced in the United States. Compared with September 1961, this was an increase of 2,400 tons or 8 percent in meal and scrap production and 608,000 gallons or 18 percent in oil.

Menhaden meal amounted to 27,200 tons--accounting for 87 percent of the September 1962 meal total. Oil from menhaden (3.7 million gallons) comprised 94 percent of the September 1962 oil production.

There were 12,000 tons of fish solubles produced in September 1962--1,500 tons above the same month of the previous year. There was no homogenized condensed fish produced in September 1962 as compared with 710 tons in the same month of 1961.

During the first 9 months of 1962, meal and scrap production totaled 238,300 tons--13,900 tons below the same period of 1961. The marine animal oil yield totaled 26.3.

Table 2 - U.S. Production of Fish Meal, Oil, and Solubles, September 1962, with Comparisons

Product	September		Jan.-Sept.		Total
	1/1962	1961	1/1962	1961	1961
.....(Short Tons).....					
Fish Meal and Scrap:					
Herring	424	525	3,051	4,987	5,268
Menhaden 2/	27,217	24,914	202,866	218,091	247,551
Sardine, Pacific	8	688	714	688	2,518
Tuna and mackerel	1,368	1,958	15,096	15,416	21,243
Unclassified	2,148	715	16,613	13,092	14,757
Total	31,165	28,800	238,340	252,274	291,337
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/	19,928
Grand total meal and scrap	3/	3/	3/	3/	311,265
Fish solubles	12,009	10,522	93,023	84,299	100,551
Homogenized condensed fish	-	710	8,065	9,407	11,690
.....(Gallons).....					
Oil, body:					
Herring	82,455	164,017	610,180	801,547	818,017
Menhaden 2/	3,733,844	2,963,935	24,495,198	27,024,984	31,355,570
Sardine, Pacific	755	22,851	21,239	22,851	86,167
Tuna and mackerel	60,223	109,968	463,022	485,145	762,509
Other (including whale)	87,037	95,741	695,831	1,141,940	1,386,542
Total oil	3,964,314	3,356,512	26,285,470	29,476,467	34,408,805

^{1/}Preliminary data.
^{2/}Includes a small quantity produced from thread herring.
^{3/}Not available on a monthly basis.

Table 3 - U.S. Foreign Trade in Selected Industrial Products, August and September 1962 with Comparisons

Product	August		September		Jan.-Sept.		Total
	1/1962	1961	1/1962	1961	1/1962	1961	1961
Imports:							
..... (Short Tons)							
Fish meal & scrap	28,253	19,026	13,698	13,941	208,694	159,503	217,845
Fish solubles	422	318	178	263	5,196	2,508	6,739
Exports:							
..... (Gallons)							
Whale oil, sperm (crude and refined) ..	-	717,855	462,576	293,081	4,740,749	4,938,798	7,807,625
..... (Pounds)							
Fish & fish-liver oils	33,271,765	13,304,278	219,241	9,521,370	96,624,014	95,374,843	122,485,721
Whale and sperm oil	6,892	-	30,300	6,826	1,972,811	169,952	1,205,674

1/Preliminary data.

million gallons--a drop of 3.2 million gallons as compared with the same period in 1961.

Imports and Exports: Imports of fish meal during January-September 1962 (208,700 tons) were 49,200 tons above the same period in 1961, and imports of fish solubles (5,200 tons) were up 2,700 tons. Exports of fish and fish-liver oils amounted to 96.6 million pounds (129 million gallons) during the first 9 months of 1962--up 1.2 million pounds (166,600 gallons) compared with the same period in 1961.

HOW MUCH FISH MEAL SHOULD BROILER RATIONS CONTAIN FOR BEST RESULTS?

The question of how much fish meal is enough in an otherwise all vegetable ration for broilers is, in part, answered by research on the subject. Levels of 7- and 10.5-percent fish meal in rations yielded significantly greater weight gains in broilers than did a 3.5-percent fish meal level. These were the results of experiments at the Mississippi State University carried out with broilers fed rations having nearly equal amounts of protein.

The two higher levels of 7- and 10.5-percent fish meal also increased efficiency of feed utilization (pounds of feed per pound of gain) when added to corn-soybean oil meal rations. Results obtained with the two higher levels of fish meal were not significantly different. These results indicate that as far as the fish growth factor of UGF (unidentified growth factor) is concerned, a 3.5-percent level of fish meal is not enough whereas a 7-percent level is sufficient. Where

neither 3.5-percent fish meal nor 4-percent condensed fish solubles as the only source of animal protein in a ration was adequate for maximum growth and feed efficiency, excellent results were obtained with 3.5-percent fish meal plus 4-percent fish solubles.

Broiler rations containing 7-percent fish meal were not improved by the addition of methionine (an amino acid or protein constituent), showing that this level of fish meal supplies all the methionine that is required. In addition, the efficiency of feed utilization was about the same at relatively high and low levels of protein intake when as much as 7-percent of the ration consisted of fish meal. But this was not true with only 3.5-percent fish meal. This means that 7-percent fish meal in a corn-soybean oil meal ration fully supplies the required amounts of methionine and other necessary amino acids. Raising the fish meal level to 10.5 percent did not further improve the ration.

According to research reported by nutritionists in the July issue of Poultry Science, a 7-percent fish meal level is enough in an otherwise all vegetable broiler ration. Poultry Science is the official journal of the Poultry Science Association.

MORE FISH MEAL AND OIL IN ANIMAL MIXED FEEDS ENCOURAGED:

The Midwest represents a good potential market for the additional use of fish meal in noncritical rations where only very small amounts are used primarily so that the meal can be mentioned on the tag. This was the opinion of a U. S. Bureau of Commercial Fisheries animal nutritionist after a trip to

Illinois and Missouri to encourage the use of more fish meal in mixed feeds, and to determine possible ways in which more fish oil can be utilized in animal feeding.

Fish meal is generally used in Illinois in critical rations such as breeder, turkey starter, and broiler rations, despite the added transportation charges that increase costs of industrial fishery products in the Midwest.

There is only a limited demand at this time for stabilized fish oil for use in poultry feeds. Eventually, uses may be found for the oil in feeds other than poultry feeds. In order to increase the demand for fish oil, quality should be improved, and definite efforts should be made to:

1. Produce a uniform and dependable product.
2. Stabilize the oil.
3. Determine how fish oil can best be marketed. (As pure fish oil? As a blend? As a partially hydrogenated fat?)

A long-range point of view suggests that research should be carried out to determine uses of fish oil in animal nutrition, in addition to those already known.

At the Annual Convention of the National Feed Ingredients Association, held September 12-14, 1962, at Chicago, a motion picture produced by Successful Farming, "Farming's New Face," was shown. The basic idea conveyed by the picture is that with the formation, now taking place in the United States, of relatively large farm units from several small farms, profits to farm operators have increased. As a result of increased profits, such operators are now potentially better customers of feed and other supplies than they were formally.

In the sectional meetings of the Chicago Convention, both the "feed manufacturers" and the "specialty ingredients" groups seemed mainly concerned with Food and Drug Administration (FDA) restrictions on labeling. When feed producers wish to add a new drug to their feed line, they need permission from FDA under certain conditions but not under others. In general, if the additive is supposed to have a therapeutic effect (medicine), permission is needed. If the additive is considered a nutrient only, then permission from FDA is not needed.

A great deal of interest in trace minerals in nutrition was in evidence at the Convention meetings. The known diseases related to trace mineral deficiencies were described. Processors of salt and other minerals were represented by specialists on the program who pointed out the values of their products in preventing deficiencies.



Inventions

NEW OUTBOARD MOTOR TILTING DEVICE PATENTED:

The inventor of an outboard motor tilting device claims his device allows a person in any part of a small boat to lift the motor easily. He claims the device is very useful when the motor is stuck in sand or mud. It consists of an elongated rod which is attached in an upright position to the forward tilting handle of an outboard motor. A cable is attached to the top of the rod and then looped about the rear tilting handle of the motor. To tilt the motor, the top of the elongated rod is pulled forward. The device is simple, inexpensive, and easily attached and detached. (Patent Number 2,979,017, U. S. Patent Office Classification Number 115-17, granted April 11, 1961, to Donald H. Soper, 1015 L. Avenue, Nevada, Iowa.)

NEW FISH LURE PATENTED:

The inventor of a new fish lure claims his lure is long-lasting and creates the impression of a swimming fish by the use of multi-colored mirrors which rotate within sealed watertight transparent plastic tubing. The lure turns freely on a metal shaft. Angular fins on the outside create a rotary movement. (Patent Number 3,031,796, U. S. Patent Office Classification Number 43-42.2, granted May 1, 1962, to Carl Ellis Swenson, 9 Magnolia Street, Bergenfield, N. J.)

NEW LIFEBOAT LAUNCHING DEVICE PATENTED:

The inventor of a new lifeboat launching device claims his device can be used for launching lifeboats or rafts even if a ship is tilted or has its port holes open. The device consists of a metal carriage and cradle. The carriage has 8 wheels which go over a ship's port holes. The cradle sits in the carriage

on a pivot which holds the lifeboat at even keel at all times. The lifeboat is ready for launching by one man at all times and is automatically released once it is in the water. (Patent Number 3,032,786, U. S. Patent Office Classification Number 9-41, granted May 8, 1962, to Frank and Russell W. Hudson, Box 411, Line Road, Manorville, L. I., N. Y.)



Massachusetts

NEW MARINE FISHERIES ADVISORY COMMISSION:

The purpose of the new Massachusetts marine fisheries law (Chapter 715) which became effective July 23, 1962, was to immediately bring about the orderly and coordinated activities of the Massachusetts marine fisheries and all related activities. The law as amended provided for a Marine Fisheries Advisory Commission composed of 9 members within the Division of Marine Fisheries. All 9 members appointed by the Governor of Massachusetts were confirmed by The Governor's Executive Council by the end of October 1962.

The members of the new Commission are given considerable latitude in using their experience, knowledge, and ideas for the benefit of the Commonwealth of Massachusetts in the field of marine fisheries. Under the law, meetings must be held at least quarterly, but opinions were that more than 4 meetings a year would be held, with perhaps as many as 10 a year, according to one suggestion.

The Director of the Massachusetts Division of Marine Fisheries said he was certain the new Commission would be a great help to the State. He stated that when fisheries matters come up in the future, point of view of various interests can be expressed through the Commission, instead of having hundreds of persons forced to give up a day's work in order to attend meetings.

Commission members pointed out that there were numerous problems to be resolved but that none was yet singled out for priority. There was a possibility of early consideration to the question of how to regulate tuna fishing, bearing in mind the interests of both sport fishermen and commer-

cial fishermen. Zoning of certain waters for one or the other interests also was proposed.

It appeared that the Commission would not immediately consider the spending of additional money for the benefit of the fisheries. Funds were expected to be available in the coming year, with a quarter of a million dollars estimated as potentially available from the State tax on fuel consumed by boats.

Members of the new Commission include a cross-section of well known persons in the Massachusetts commercial and sport fisheries, and related industries.

Note: See Commercial Fisheries Review, September 1962 p. 34.



Michigan

LAKE TROUT PLANTED IN SIX LAKES:

Michigan's late fall lake trout planting program called for some 32,500 lake trout to be released for restocking six lakes in the northern peninsula, announced the Michigan Department of Conservation on November 1, 1962.

A total of 5,000 lake trout were released in Big Glen Lake, Leelanau County, during the latter part of October. Other lakes scheduled for lake trout restocking early in November were: Higgins Lake, Roscommon County, 10,000 fish; Elk and Torch Lakes, Antrim County, 5,000 each; Walloon Lake, Emmett County, 5,000; Lake Avalon, Montmorency County, 2,500.

The plantings were made at dusk when seagulls have less chance of preying on the fish before they take to deep water. Releases consisted of 2-year-old lake trout measuring 7 inches and longer.

About 5,000 lake trout were planted in Crystal Lake, Benzie County, in the spring of 1962, as part of Michigan's Department of Conservation 1962 lake trout planting program.

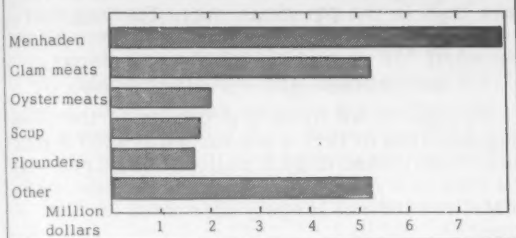


Middle Atlantic States

FISHERY LANDINGS, 1961:

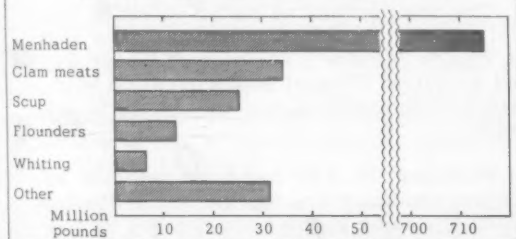
Landings of fish and shellfish in the Middle Atlantic States (New York, New Jersey,

VALUE OF MIDDLE ATLANTIC STATES CATCH, 1961



and Delaware) during 1961, totaled 825 million pounds valued at \$24 million ex-vessel. Landings (up 41.6 million pounds over 1960) were the highest since 1957. The value was more than \$2 million over the previous year. Increased catches of menhaden largely accounted for the gain in volume. The higher value was mainly the result of improved prices received for menhaden and oysters.

MIDDLE ATLANTIC STATES CATCH, 1961



New Jersey, with 397 million pounds, accounted for 48 percent of the catch, followed by Delaware with 37 percent. New



Boxing and icing butterfish from vessel at Fulton Fish Market, New York City.

Jersey also led in ex-vessel value with \$11 million or 46 percent of the total; New York was second with 38 percent.

There were 8,559 fishermen engaged in the Middle Atlantic fisheries in 1961--227 more than in 1960. This increase took place in the shore and boat fisheries; fewer men fished aboard vessels. Fishing craft operated in the Middle Atlantic area during the year consisted of 602 vessels (31,159 gross tons), 3,676 motorboats, and 447 other boats.

Manufactured fishery products of the Middle Atlantic area in 1961 amounted to \$91.8 million--an increase of \$11.4 million over the previous year. Increased production of breaded fresh or frozen fish, canned fish and shellfish, smoked and kippered fish, and industrial products largely accounted for the gain.



Missouri

FISHERIES RESEARCH UNIT FOR MISSOURI UNIVERSITY:

The Missouri Conservation Commission, the U. S. Fish and Wildlife Service, and the University of Missouri will cooperate in establishing a fisheries research unit at the university. It will be the third such unit in the nation.

The research unit will be staffed by two employees of the Fish and Wildlife Service and will have its facilities in the wildlife building, Stephens Hall, on the university's campus. The work will include research, teaching, extension, and fish resource surveys.

With the university furnishing the quarters, the Conservation Commission will furnish \$10,000 and the Fish and Wildlife Service will furnish \$30,000. Of the Federal appropriation, \$3,000 will be used for administration at the regional and national level and \$27,000 will come into Missouri.

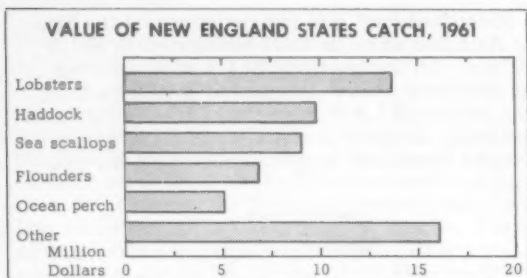
The unit is expected to go into operation this fall after a unit leader is selected, according to an October 12, 1962, news release from the Conservation Commission.



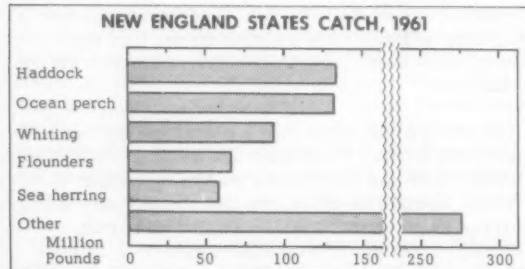
New England

FISHERIES, 1961:

Fish and shellfish landings in the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) during 1961 amounted to 760 million pounds valued at \$60.9 million ex-vessel. The 1961 catch was 92 million pounds less than in the previous year and the smallest in that region since 1944. The value fell \$616,000 below the 1960 level.



Only one State--Rhode Island--gained in volume over 1961. This increase of nearly 15 million pounds resulted from larger landings of fish taken for industrial purposes.



The 1961 decline in volume was due chiefly to greatly reduced landings of Maine sea herring. Total landings of that species fell from 155 million pounds in 1960 to 58 million pounds--the lowest yield since 1940. The value decreased more than \$1 million ex-vessel. Landings of menhaden were down almost 17 million pounds; whiting, down 10 million pounds; ocean perch, down 9 million pounds; and lobsters, down over 3 million pounds. There were moderate increases in the catches of haddock, scup, cod, flounders, alewives, and species taken for industrial use. Sea scallop landings of 23.8 million pounds (mostly at New Bedford, Mass.), exceeded the 1960 record yield of 22.5 million pounds.

There were 21,737 fishermen engaged in the New England fisheries in 1961--about 463 less than in the previous year. Fishing craft in the New England area during the year consisted of 738 vessels (44,242 gross tons), 11,155 motor boats, and 709 other boats.

Manufactured fishery products of the New England area in 1961 were valued at \$107.8 million--a decrease of \$8.9 million compared with the previous year. A decline in the canned pack of Maine sardines largely accounted for the drop.



Ohio River Basin

WATER QUALITY MANAGEMENT PLAN FOR UPPER OHIO RIVER BASIN:

A six-year water quality management plan for the upper Ohio River Basin was announced on October 31, 1962, by the Secretary of Health, Education, and Welfare.

The comprehensive water pollution control program will be conducted by the Public Health Service's Division of Water Supply and Pollution Control in cooperation with states, communities, and industries of the basin.

Wheeling, W. Va., has been selected as project headquarters for the initial studies which are to be in the area drained by the Allegheny, Monongahela, Beaver, Muskingum, Hocking, Kanawha Rivers, and the Ohio River itself upstream from the mouth of the Kanawha River.

Acid mine drainage is probably the greatest single pollution problem in the basin and constitutes the greatest unknown factor with respect to satisfactory and economical means for pollution control and abatement.

The object of the study is to assure the Ohio River Basin of high quality water which will help improve the economy and recreational facilities of the area and protect the public health.

At its peak of activity a staff of 40 to 50 engineers, chemists, biologists, and other scientific and supporting personnel will be required to collect and evaluate the plan's engineering and laboratory data.



Salmon

INTERIOR DEPARTMENT TO INTERVENE IN NEW DON PEDRO (CALIF.) RESERVOIR PROJECT HEARING:

To safeguard an average annual run of about 40,000 chinook salmon in California's Tuolumne River, the U. S. Department of the Interior announced its intention to intervene in a Federal Power Commission hearing on a license application for the proposed Don Pedro dam and reservoir project near La Grange, Calif.

The salmon are an important interstate and international fishery resource, supporting sport and commercial fisheries, not only in California waters, but also in the Pacific Ocean off the coasts of Oregon, Washington, British Columbia and, probably southern Alaska, the Department said.

Studies by the Department's Fish and Wildlife Service indicate that the new Don Pedro project, as proposed, would jeopardize the fish runs unless minimum flows downstream are guaranteed by the license applicants, the Turlock and Modesto Irrigation Districts. The project, in addition to producing hydroelectric power, will supply municipal water to the City of San Francisco for marketing to localities and communities outside the city.

The application for a license to construct the dam was filed with the Federal Power Commission over a year ago. Since then, the California Department of Fish and Game and the Fish and Wildlife Service have held discussions with the applicants to try and reach a compromise that would allow the project to be constructed and still maintain the valuable fishery. This fishery annually produces about one million pounds of commercial salmon and provides 36,000 man-days of sport fishing.

Under the terms requested in the application by the irrigation districts it would be possible to remove all the water from the Tuolumne River in dry years.

Negotiators from the California Fish and Game Department, the City and County of San Francisco, and the irrigation districts drafted a proposed agreement on the problem subject to ratification by their governing bodies. This agreement, however, was rejected as inadequate by the California Fish and Game Commission at its meeting July

20, 1962. Following this rejection, the Federal Power Commission scheduled a hearing on the project for October 16, 1962, in San Francisco.

The Interior Department has now started action to intervene formally in the case and to participate in the hearing in order to present license conditions to protect adequately the fishery resources of the Tuolumne River.



Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, OCTOBER 1962:

Item and Period	1962	1961	1960	1959	1958
..... (1,000 Lbs., Heads=Off)					
Total landings, So. Atl. and Gulf States:					
December	-	6,538	7,097	8,716	8,099
November	-	9,996	14,454	12,412	12,416
October	13,000	12,696	21,690	19,602	16,461
January-September	69,280	62,165	97,794	89,929	79,576
January-December	-	91,395	141,035	130,659	116,552
Quantity canned, Gulf States 1/:					
December	-	800	877	1,278	1,943
November	-	2,215	1,614	2,312	3,424
October	3,900	2,310	2,567	2,531	3,489
January-September	15,154	10,438	23,436	18,558	17,548
January-December	-	15,763	28,594	24,679	26,404
Frozen inventories (as of end of each mo.) 2/:					
December 31	-	19,755	40,913	37,866	32,844
November 30	-	20,668	37,264	37,334	30,211
October 31	18,944	17,811	31,209	33,057	24,620
September 30	14,111	13,361	24,492	26,119	18,079
August 31	12,754	12,728	20,171	23,780	15,274
July 31	13,677	14,849	17,397	22,352	12,351
February 28	19,012	37,612	29,063	27,555	16,359
Imports 3/:					
December	-	15,442	12,411	10,611	10,448
November	-	14,852	13,516	10,269	10,617
October	4/	16,813	14,211	15,340	11,463
September	9,696	8,629	8,190	7,541	7,620
January-August	79,647	70,546	65,090	62,794	45,246
January-December	-	126,282	113,418	106,555	85,394
... (c/lb., 26-30 Count, Heads=Off) ...					
Ex-vessel price, all species So. Atl. and Gulf Ports:					
December	-	75.2	54.2	48.4	70.8
November	-	73.5	54.0	46.2	69.0
October	5/96.0	68.7	53.0	44.4	66.4
September	5/95.0	70.1	52.2	46.4	65.6
August	5/93.0	66.1	52.0	46.9	70.8
July	5/90.0	55.6	54.6	49.2	72.6
January-June	81.0	53.8	56.7	66.5	74.9
Wholesale price for froz. domestic brown species (5-lb. pkg.) at Chicago, Ill.:					
December	-	91-92	68-70	64-66	87-89
November	-	89-92	69-73	60-65	83-87
October	111-115	83-90	69-73	59-62	80-84
September	113-118	87-90	65-70	62-64	78-84
August	110-112	75-81	64-67	62-64	81-86
July	-	70-75	72-77	62-74	90-93
January-June	91-104	67-72	64-77	70-88	81-98

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 35.
 2/Raw headless only; excludes breaded, peeled and deveined, etc.
 3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
 4/Not available.
 5/Estimated.
 Note: Data for 1962 and 1961 are preliminary. October 1962 data estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.

Tuna

PACK IN UNITED STATES AND TERRITORIES IN 1962 AT RECORD HIGH:

As of November 1 for the United States west coast and as of October 1 for Hawaii, American Samoa, and Puerto Rico, this year's combined tuna pack for those areas totaled about 12.9 million cases--an increase of 800,000 cases or 6.6 percent as compared with the previous record pack in 1961 for the same period. The pack in the areas mentioned represents about 70 percent of the total pack in the United States, American Samoa, and Puerto Rico, during 1962.

The California tuna pack up to November 1 totaled 9.6 million cases in 1962, or an increase of 500,000 cases as compared to the same period in 1961. Up to October 1, the combined 1962 pack in Puerto Rico, American Samoa, and Hawaii of almost 2.8 million cases was over 400,000 cases more than at the same date in 1961. The increase was both in white meat and light meat tuna.

* * * * *

BLUEFIN TAGGED OFF CALIFORNIA:

A total of 960 tagged bluefin tuna was released from the commercial purse-seiner West Point August 13-23, 1962, by the U. S. Bureau of Commercial Fisheries Biological Laboratory, San Diego, in cooperation with the California Department of Fish and Game.

Releases were made about 30 miles north of the 176-Fathom Spot (30° N., 117° W.), the 43-Fathom Spot (32°36' N., 118°06' W.), and 20 miles west of the north end of San Clemente Island (33°00' N., 119°00' W.). These releases are the first of a series designed to provide vital information on migration, availability, and other aspects of the life history of this little-known tuna in the eastern north Pacific.

Tags used are of standard yellow plastic dart-type design, identical to those used by the Inter-American Tropical Tuna Commission for marking of yellowfin and skipjack, and are attached to the left side of the fish below and aft of the second dorsal fin. The tags are marked "Return to California Department of Fish and Game." If you should catch a tagged bluefin, please preserve the specimen. Upon return to port, contact waterfront representatives of the Tuna Commission, California Department of Fish and

Game, or U. S. Bureau of Commercial Fisheries. Any one of these representatives will measure and check the condition of the fish, as well as take the tag from it. Be sure to record the date and location of capture. There is a \$1.00 reward for the return of each properly documented tag.

* * * * *

SHARK-TUNA RELATIONSHIPS IN EASTERN PACIFIC UNDER STUDY:

A study of sharks and their relationships with the tropical tuna species has been started by scientists of the U. S. Bureau of Commercial Fisheries Biological Laboratory, San Diego. A total of 160 tagged sharks has been released. Of that number, 70 were released from the commercial fishing vessel Royal Pacific off Guatemala, Colombia, and Ecuador; the remainder were released from the commercial purse-seiner West Point off the Revilla Gigedo Islands.

The tags are monel metal straps attached to the dorsal fin of the shark. A colored vinyl disk has been added on the latest tags to make them more conspicuous. Purse-seine fishermen are requested to look over all sharks taken in purse-seine hauls--a \$1.00 reward will be paid to persons recovering the tags and noting the date and place of capture.



United States Fisheries

COMMERCIAL FISHERY LANDINGS, JANUARY-OCTOBER 1962:

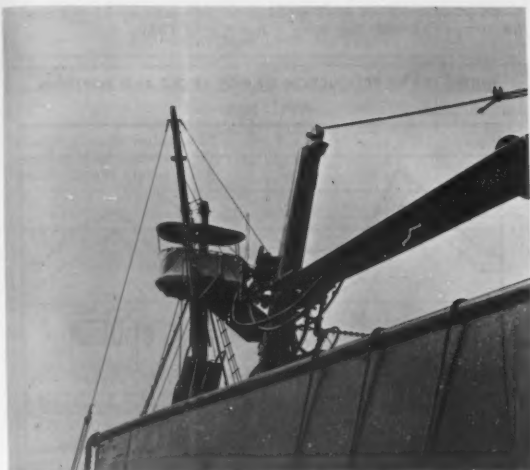
Landings: Landings of fish and shellfish in the United States during the first 10 months of 1962 were 63 million pounds or 2 percent more than during the same period a year earlier. The gain resulted from sharply increased production of menhaden and Maine herring.

Menhaden: Total landings for the first 10 months of 1962 amounted to 2,160.0 million pounds--about 21 million pounds more than during the same period in 1961. During October, there was a marked increase in landings all along the Atlantic and Gulf Coasts as compared with October 1961.

Salmon: On the basis of the reported pack of canned salmon, it was estimated that the Alaska catch for the 1962 season totaled approximately 280 million pounds--15 million pounds more than in 1961.

Tuna: Landings in California (including transshipments of United States-caught fish from South America) totaled about 257 million pounds to November 10, 1962--30 million pounds less than for the same period in 1961.

Shrimp: South-Atlantic and Gulf States landings amounted to 16.4 million pounds in the first 9 months of 1962--an increase of 12 million pounds as compared with the same



Crows nest of a menhaden fishing vessel operating out of Reedville, Va.

period in 1961. A slight upward trend took place in the landings in all but three of the states.

Mackerel: Jack mackerel landings of 65 million pounds to November 3, 1962, fell slightly below the 70.4 million pounds taken during the same period in 1961. Pacific mackerel with 34.7 million pounds exceeded by 3 million pounds the 1961 landings through the same date.

Maine herring: Landings through September 1962 totaled 142 million pounds--up sharply from the 39.2 million pounds taken during the first 9 months of 1961.



In some areas, shell oysters are brought to the shucking plants in bags. Shuckers may be paid by the number of bags shucked rather than by the volume of shucked oysters. This is the reason for compartmented benches in this New Orleans oyster shucking plant.

United States Commercial Fishery Landings for Periods Shown, 1962 and 1961				
Species	Period	1/1962	1961	Total 1961
.....(1,000 Lbs.).....				
Anchovies, Calif.	to Nov. 3	1,800	5,762	7,712
Cod:				
Maine	8 mos.	1,700	1,908	2,507
Boston	10 "	19,600	17,300	18,837
Gloucester	10 "	3,100	2,585	3,358
Total cod		24,400	21,793	24,702
Haddock:				
Maine	8 mos.	1,500	1,881	2,940
Boston	10 "	74,700	73,800	84,093
Gloucester	10 "	13,600	12,722	15,025
Total haddock		89,800	88,403	102,058
Halibut 2/:				
Alaska	9 mos.	27,100	24,496	25,077
Wash. & Oreg.	9 "	11,900	14,121	14,947
Total halibut		39,000	38,617	40,024
Herring, Maine	9 mos.	142,000	39,235	54,463
Industrial Fish, Me. & Mass. 3/	10 mos.	40,400	40,186	41,851
Mackerel:				
Jack	to Nov. 3	65,100	70,438	97,606
Pacific	to Nov. 3	34,700	31,688	44,110
Menhaden	10 mos.	2,160,000	2,139,207	2,314,677
Ocean perch:				
Maine	8 mos.	50,800	55,606	77,350
Boston	10 "	700	558	701
Gloucester	10 "	50,600	49,876	53,991
Total ocean perch		102,100	106,041	132,042
Salmon:				
Alaska	year	279,700	264,814	264,814
Oregon	5 mos.	1,200	835	7,064
California	year	6,000	8,638	8,638
Sardine, Pacific ...	to Nov. 15	13,300	31,333	43,169
Scallops, sea, New Bedford (meats)	10 mos.	17,000	17,534	20,648
Shrimp (heads-on):				
So. Atl. & Gulf ...	9 mos.	116,400	104,436	153,544
Washington	9 "	1,400	751	1,464
Oregon	5 "	1,000	224	1,427
Squid, California ...	9 mos.	7,100	1,360	5,410
Tuna, California ...	to Nov. 10	257,300	286,890	307,263
Whiting:				
Maine	8 mos.	17,500	13,761	14,147
Boston	10 "	200	99	144
Gloucester	10 "	4,700	49,189	51,598
Total whiting		22,400	63,049	65,889
Total all above items ...		3,422,100	3,361,234	3,738,575
Other 4/		665,700	663,530	1,442,196
Grand Total		4,087,800	4,024,764	5,180,771

1/ Preliminary.

2/ Dressed weight.

3/ Excludes menhaden.

4/ Includes landings for species not listed.

Note: Finfish generally converted to round weight, crustaceans to weight in the shell, and mollusks reported in meats only.

FISH STICKS AND PORTIONS PRODUCTION, JULY-SEPTEMBER 1962:

United States production of fish sticks amounted to 15.8 million pounds and that of fish portions was 18.5 million pounds during the third quarter of 1962, according to preliminary data. This was a gain of nearly 1 percent in fish sticks and 26 percent in portions as compared with the same

Table 1 - U.S. Production of Fish Sticks by Months and Type, July-September 1962 1/

Month	Cooked	Raw	Total
 (1,000 Lbs.)		
July	3,262	351	3,613
August	5,315	381	5,696
September	6,005	501	6,506
Total 3rd Qtr. 1962 1/	14,582	1,233	15,815
Total 3rd Qtr. 1961 .	14,450	1,258	15,708
Tot. 1st 9 mos. 1962 1/	49,049	3,725	52,774
Tot. 1st 9 mos. 1961 .	48,172	3,608	51,780
Tot. Jan.-Dec. 1961 .	65,006	4,813	69,819

1/Preliminary.

Table 2 - U. S. Production of Fish Sticks by Areas, July-September 1962 and 1961

Area	1/ 1962		2/ 1961	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	20	12,789	22	12,625
Inland & Gulf States .	4	1,765	6	1,647
Pacific Coast States .	8	1,261	10	1,436
Total	32	15,815	38	15,708

1/Preliminary.

2/Revised.

Table 3 - U.S. Production of Fish Sticks by Months, 1958-1962

Month	1/1962	2/1961	1960	1959	1958
 (1,000 Lbs.)				
January	6,104	6,091	5,511	6,277	5,471
February	6,859	7,092	6,542	6,352	5,925
March	7,706	7,233	7,844	5,604	5,526
April	5,480	5,599	4,871	4,717	4,855
May	5,609	5,129	3,707	4,407	4,229
June	5,058	4,928	4,369	4,583	4,702
July	3,613	3,575	3,691	3,790	4,574
August	5,696	6,927	5,013	3,879	4,358
September	6,506	5,206	5,424	5,353	5,328
October	-	6,133	6,560	5,842	5,485
November	-	6,288	6,281	4,831	5,091
December	-	5,618	5,329	4,743	5,467
Total	-	69,819	65,142	60,378	61,011

1/Preliminary.

2/Revised.

quarter of 1961. The increase in portions was due mainly to greater production of raw breaded portions (up 3.8 million pounds).

Cooked fish sticks (14.6 million pounds) made up 92 percent of the fish stick total. The remaining 8 percent consisted of raw fish sticks. A total of 18 million pounds of breaded fish portions (of which 15 million pounds were raw) and 537,000 pounds of unbreaded portions were processed during the third quarter of 1962.

Plants on the Atlantic Coast produced the bulk of the fish sticks and portions--22.4 million pounds. The Gulf and inland States produced 10 million pounds, and the Pacific Coast States, 1.9 million pounds.

During the first 9 months of 1962, fish stick production of 52.8 million pounds was up 2 percent, and the fish por-

tions production of 55.3 million pounds was up 31 percent as compared with the first 9 months of 1961.

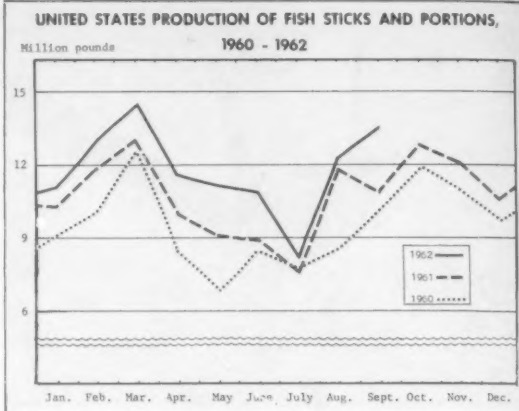


Table 4 - U. S. Production of Fish Portions by Months and Type, July-September 1962 1/

Month	Breaded			Unbreaded	Total
	Cooked	Raw	Total		
 (1,000 Lbs.)				
July	486	3,998	4,484	222	4,706
August	957	5,565	6,522	140	6,662
September ..	1,561	5,423	6,984	175	7,159
Tot. 3rd Qtr. 1962 1/ ..	3,004	14,986	17,990	537	18,527
Tot. 3rd Qtr. 1961	2,597	11,633	14,230	440	14,670
Tot. 1st 9 mos. 1962 1/ ..	9,743	43,995	53,738	1,580	55,318
Tot. 1st 9 mos. 1961	7,485	33,219	40,704	1,404	42,108
Tot. Jan.-Dec. 1961	11,003	46,783	57,786	2,061	59,847
1/Preliminary.					

1/Preliminary.

Table 5 - U. S. Production of Fish Portions by Months, 1958-1962

Month	1/1962	2/1961	1960	1959	1958
 (1,000 Lbs.)				
January	5,102	4,303	3,632	2,692	1,973
February	6,374	4,902	3,502	3,025	1,254
March	6,931	5,831	4,706	3,225	1,471
April	6,350	4,484	3,492	2,634	2,268
May	5,749	3,879	3,253	2,684	1,478
June	6,082	4,039	3,995	3,247	1,504
July	4,706	3,962	4,088	2,227	2,161
August	6,662	4,963	3,558	2,796	1,516
September	7,159	5,745	4,631	3,558	1,566
October	-	6,759	5,275	4,314	2,560
November	-	5,789	4,790	3,483	1,979
December	-	5,191	4,459	3,262	2,060
Total	-	59,847	49,381	37,147	21,790

1/Preliminary.

2/Revised.

Table 6 - Production of Fish Portions by Areas,
July-September 1962 and 1961

Area	1/ 1962		2/ 1961	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	23	9,601	23	8,744
Inland & Gulf States	7	8,258	12	5,578
Pacific Coast States	8	668	6	348
Total	38	18,527	41	14,670

1/ Preliminary.

2/ Revised.



U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, SEPTEMBER 1962:

During September 1962, a total of 26 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 22 in September 1961. There were 36 documents cancelled for fishing vessels in September 1962 as compared with 25 in September 1961.

Table 1--U.S. Fishing Vessels 1/ --Documentations Issued
and Cancelled, by Areas, September 1962 with Comparisons

Area (Home Port)	September		Jan.-Sept.		Total
	1962	1961	1962	1961	1961
.....(Number).....					
<u>Issued first documents 2/:</u>					
New England	2	1	24	27	33
Middle Atlantic	-	2	2	11	12
Chesapeake	3	5	29	48	75
South Atlantic	6	6	37	40	47
Gulf	9	4	87	87	100
Pacific	5	4	115	141	149
Great Lakes	1	-	3	11	12
Puerto Rico	-	-	-	2	2
Total	26	22	297	367	430
<u>Removed from documentation 3/:</u>					
New England	5	2	19	15	20
Middle Atlantic	3	4	31	23	34
Chesapeake	2	1	19	27	28
South Atlantic	4	2	29	21	30
Gulf	15	7	86	77	103
Pacific	4	8	82	71	112
Great Lakes	3	1	18	13	14
Hawaii	-	-	3	-	-
Puerto Rico	-	-	1	-	-
Total	36	25	288	247	341

1/For explanation of footnotes, see table 2.

1/ For explanation of footnotes, see table 2.

Table 2--U.S. Fishing Vessels--Documents Issued and
Cancelled, by Tonnage Groups, September 1962

Gross Tonnage	Issued 2/	Cancelled 3/
..... (Number)		
5-9	3	9
10-19	6	5
20-29	6	5
30-39	1	5
40-49	2	2
50-59	-	4
60-69	2	1
70-79	3	2
80-89	1	1
120-129	-	1
260-269	1	-
270-279	-	1
340-349	1	-
Total	26	36

1/ Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.

2/ Includes redocumented vessels previously removed from records. Vessels issued first documents as fishing craft were built: 18 in 1962, and 8 prior to 1950. Assigned to areas on the basis of their home ports.

3/ Includes vessels reported lost, abandoned, forfeited, solid alien, etc.

Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.



U.S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-September 29, 1962, amounted to 42,335,267 pounds (about 2,015,965 std. cases), according to data compiled by the Bureau of Customs. This was 4.1 percent more than the 40,664,702 pounds (about 1,936,414 std. cases) imported during January 1-September 30, 1961.

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1962 at the 12½-percent rate of duty is limited to 59,059,014 pounds (about 2,812,000 std. cases of 48 7-oz. cans). Any imports in excess of the quota are dutiable at 25 percent ad valorem.

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EDIBLE FISHERY PRODUCTS, SEPTEMBER 1962:

Imports of fresh, frozen and processed edible fish and shellfish into the United States in September 1962 were up 9.8 percent in quantity and 6.8 percent in value as compared with the previous month. In September, there was a large increase in imports of frozen albacore tuna (mostly from Japan and British West Pacific Islands). Imports were also

up for fish blocks and slabs, groundfish fillets, fillets other than groundfish, canned tuna in brine, canned sardines in oil (increase mostly from Norway and Portugal), canned sardines not in oil (increase from South Africa), and frozen shrimp. There was a decline in imports of some of the higher priced products such as fresh and frozen salmon (mostly from Canada), canned salmon (mostly from Canada and Japan), fresh swordfish (from Canada), canned crab meat (mostly from Japan), canned oysters (mostly from Japan), live lobsters (from Canada), frozen spiny lobsters, sea scallops (mostly from Canada), and frozen frog legs (mostly from India and Japan).

Compared with the same month in 1961, the imports in September 1962 were up 35.9 percent in quantity and 31.9 percent in value. Imports were much greater this September for frozen tuna (increase mostly from Japan and Peru). Imports also increased for fish blocks and slabs, groundfish fillets, fillets other than groundfish, fresh and frozen salmon, canned sardines not in oil, canned oysters, frozen shrimp, and frog legs. But imports of canned salmon dropped sharply and there was some decline in imports of canned tuna in brine, live lobsters (from Canada), and sea scallops.

In the first nine months of 1962, imports were up 18.1 percent in quantity and 23.9 percent in value as compared to the same period in 1961. The greater increase in value was because of the higher prices which prevailed this year for most imported fishery products. Most fishery products were imported in greater quantity this year and imports were up substantially for fish blocks or slabs (increase mostly from Norway), canned salmon (mostly from Canada and Japan), frozen tuna (increase mostly from Japan and Peru), canned tuna in brine other than albacore (mostly from Japan), canned sardines in oil, frozen shrimp, and sea scallops. Imports were down for the following products: haddock fillets, fresh and frozen salmon (mostly from Canada), canned albacore tuna in brine, canned bonito and yellowtail, canned oysters (mostly from Japan), and fresh swordfish (from Canada).

U. S. Imports and Exports of Edible Fishery Products, September 1962 with Comparisons								
Item	QUANTITY				VALUE			
	Sept.		Jan.-Sept.		Sept.		Jan.-Sept.	
	1962	1961	1962	1961	1962	1961	1962	1961
	. . (Millions of Lbs.)				. . . (Millions of \$) . .			
Imports:								
Fish & Shellfish:								
Fresh, frozen, & processed ^{1/} . .	112.8	83.0	879.4	744.6	34.7	26.3	293.5	236.8
Exports:								
Fish & Shellfish:								
Processed only ^{1/} (excluding fresh & frozen) . . .	2.5	1.3	23.7	17.4	1.1	0.7	9.9	9.0
^{1/} Includes pastes, sauces, clam chowder and juice, and other specialties.								

Exports of processed fish and shellfish from the United States in September 1962 were up 47.1 percent in quantity and 22.2 percent in value as compared with the previous month. Exports were up in September 1962 for canned salmon (mostly to the United Kingdom), canned sardines in oil, canned sardines not in oil, and canned squid. But exports were down for canned mackerel and canned shrimp (mostly to Canada and the United Kingdom).

Compared with the same month in 1961, the exports in September 1962 were up 92.3 percent in quantity and 57.1 percent in value. Exports were up this September for canned salmon, canned sardines in oil, canned sardines not in oil, canned shrimp, and canned squid. The increase was slightly offset by a decrease in exports of canned mackerel. Most of the increase in exports this September

was concentrated in the lower priced products so the value of the exports did not increase as much as the quantity.

Processed fish and shellfish exports for the first nine months of 1962 were up 36.2 percent in quantity, but the value was up only 10.0 percent as compared with the same period of 1961. Exports of the lower priced canned squid (principally to Greece and the Philippines) showed the greatest increase in 1962. Exports were also up for canned mackerel, canned salmon, and canned sardines not in oil. But exports were down for canned shrimp (decline mostly in exports to Canada and the United Kingdom). Although not covered in the table, exports were up for frozen salmon, and were down for frozen shrimp (decline mostly in exports to Japan) and shucked oysters (principally to Canada).



Wholesale Prices

EDIBLE FISH AND SHELLFISH, OCTOBER 1962:

Prices of fishery products during October 1962 were generally slightly lower. The October 1962 wholesale price index for edible fishery products (fresh, frozen, and canned) at 119.0 percent of the 1957-59 average was lower (down 0.7 percent) than for September because of lower prices for fresh and frozen shrimp, a more marked price drop for frozen salmon, and a sharp price decrease for Great Lakes yellow pike. As compared with October a year earlier, most of the fishery products index items were higher priced in October 1962.

The fresh and frozen drawn, dressed, or whole finfish subgroup index this October dropped 3.4 percent from the previous month due to lower prices at New York City for frozen dressed king salmon (down 6 percent) and Great Lakes yellow pike (down 15.2 percent). From September to October 1962, prices rose for fresh large haddock (ex-vessel price at Boston up 1 cent a pound, or 5.2 percent), frozen dressed western halibut (wholesale price at New York City up 2.4 percent), and fresh Lake Superior whitefish (wholesale price at



Shrimp, prior to canning, being carefully inspected at a canning plant in Westwego, La.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1962 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes 2/ (1957-59=100)			
			Oct. 1962	Sept. 1962	Oct. 1962	Sept. 1962	Aug. 1962	Oct. 3/1961
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					119.0	119.8	121.6	111.2
Fresh & Frozen Fishery Products:					124.3	125.6	124.3	109.1
Drawn, Dressed, or Whole Finfish:					120.7	125.0	131.6	107.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.11	.10	82.2	78.1	109.8	82.6
Halibut, west., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.44	.43	129.6	126.6	138.9	102.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.98	1.05	136.2	146.3	146.7	118.8
Whitefish, L., Superior, drawn, fresh	Chicago	lb.	.73	.66	108.2	98.5	78.4	103.0
Yellow pike, L., Michigan & Huron, rnd., fresh	New York	lb.	.48	.56	77.8	91.7	81.9	73.7
Processed, Fresh (Fish & Shellfish):					123.8	123.1	117.6	113.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.38	.36	92.3	86.2	89.8	77.7
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.05	1.07	122.5	125.4	114.3	101.4
Oysters, shucked, standards	Norfolk	gal.	7.75	7.50	130.7	126.5	126.5	134.9
Processed, Frozen (Fish & Shellfish):					122.7	122.8	117.8	102.5
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	100.1	100.1	100.1	97.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.36	.35	105.5	101.1	101.1	96.7
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	110.4	110.4	105.2	105.1
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.13	1.15	134.0	136.4	128.1	104.4
Canned Fishery Products:					110.2	110.2	117.4	115.5
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	25.50	25.50	111.1	111.1	124.2	122.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.75	11.75	104.4	104.4	107.9	103.5
Sardines, Calif., tom. pack, No. 1 oval (1.5 oz.), 24 cans/cs.	Los Angeles	cs.	5.25	5.25	118.5	118.5	118.5	110.6
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	9.11	9.11	116.9	116.9	119.4	132.2

1/Represents average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

2/Beginning with January 1962 indexes, the reference base of 1947-49=100 was superseded by the new reference base of 1957-59=100.

3/Recomputed to be comparable to 1957-59=100 base indexes.

Chicago up 7 cents a pound, or 9.8 percent). Compared with the same month of 1961, the subgroup index this October rose 12.7 percent. Prices were up sharply for frozen dressed western halibut (up 26.3 percent) and frozen dressed king salmon (up 14.6 percent); prices were also higher for Lake Superior whitefish (up 5 percent) and yellow pike (up 5.6 percent).

The fresh processed fish and shellfish subgroup index rose slightly (up 0.6 percent) from September to October this year, and was up 9.1 percent from October 1961. Fresh shrimp prices at New York City were firm in September, but brief fluctuations toward the end of that month indicated the beginning of a downward trend from the spiraling midsummer prices. Although fresh shrimp prices this October were down 2.3 percent from the previous month, they were still 20.8 percent higher than in the same month of 1961. Prices this October for fresh small haddock fillets at Boston were higher (up 7.1 percent) than in September and in October 1961 (up 18.8 percent). Fresh shucked oysters (standards) at Norfolk in October rose 25 cents a gallon from September, but were lower than the \$8.00 high of October 1961.

Slightly lower frozen shrimp prices caused a fractional decrease (down 0.1 percent) in the processed frozen fish and shellfish subgroup index this October, but the index was still 19.7 percent higher than in October 1961. From September to October, prices were lower for frozen shrimp (wholesale prices at Chicago down 2 cents a pound, or 1.8 percent), but prices were higher for haddock fillets (up 4.5 percent) at Boston. The shrimp supply situation improved somewhat in Oc-

tober with an increase of about 6 million pounds in stocks of raw headless shrimp from the end of September to the end of October. Domestic shrimp landings were better in October, but much of the increase was in imports from Mexico. As compared with October 1961, prices this October were higher for all items in the subgroup; prices for frozen shrimp were up 28.4 percent and haddock fillets were up 9.1 percent.

The canned fishery products subgroup index in October was unchanged from September, but was down 4.6 percent from October 1961 due to lower prices of canned Pacific salmon and canned Maine sardines. Prices of all items in the canned fish subgroup this October were the same as the previous month. The 1962 packs of canned tuna, canned Maine sardines, and canned pink salmon all exceeded those of the previous season. As of the end of October, the California canned tuna pack amounted to 9.6 million cases; the canned Maine sardine pack was 2.1 million cases, the first season since 1958 that the pack exceeded 2 million cases; the Alaska pink salmon pack was about 1.8 million cases, the largest pack for the past 8 years.

As compared with a year earlier, canned tuna prices this October were still about 1 percent higher but canned Maine sardine prices were 11.6 percent lower than at the same time last year. The October 1962 California sardine landings were very light. Stocks of California canned sardines were limited in October with prices holding at \$5.25 a case the same as in September, but 7.1 percent higher than a year earlier.





International

GENERAL AGREEMENT ON TARIFFS AND TRADE

TWENTIETH SESSION OF CONTRACTING PARTIES:

The 20th Session of the Contracting Parties to the General Agreement on Tariffs and Trade met in Geneva, Switzerland, from October 23 to November 16, 1962. The Assistant Secretary of State for Economic Affairs headed the United States Delegation.

The Contracting Parties considered an agenda of more than 60 items. A major topic was an assessment of progress made in the GATT Program for the Expansion of International Trade since it was dealt with at the 1961 GATT Ministerial Meeting. Key elements of this program are tariff reduction, improved access to markets for agricultural products, and removal of obstacles to the trade of the less developed countries.

The United States Delegation gave special attention to quantitative restrictions originally justified for balance of payments reasons, but which are now in violation of the GATT. Increasing United States concern over quantitative restrictions has led to a formal complaint against French and Italian quota restrictions which was listed on the agenda at this Session for action. Also pending is the Canadian Government's recent imposition of customs duty surcharges. The U. S. Delegation hoped to seek the earliest possible elimination of these surcharges.

The progress of regional economic groupings were reviewed, including the Latin American Free Trade Area, the Central American Free Trade Area, and particularly the Common Agricultural Policy of the European Economic Community.

At least two newly-independent nations, Trinidad and Tobago and Uganda, were to be admitted formally as contracting parties at the Session. The GATT membership has

been growing steadily now numbering 42 nations covering more than 80 percent of free world trade. The Contracting Parties were expected to consider the future relationship to the GATT of Argentina, Poland, Spain, and Yugoslavia, which now participate in the work of the GATT under various special arrangements.

The GATT is the basic international instrument guiding commercial relations among most of the principal trading nations of the world. The provisions of the GATT are designed to expand international trade and thereby to raise living standards, increase productive employment, and utilize more fully the resources of the world. The meetings of the Contracting Parties provide an international forum to discuss trade policy problems and to resolve trade difficulties in a manner conducive to the growth rather than the reduction of trade levels.

EUROPE

WEST EUROPEAN FISHERY CONFERENCE HELD IN GÖTEBORG:

On September 6, 1962, a total of 42 delegates attended the West European Fishery Conference held in Göteborg, Sweden. Belgium, Denmark, France, West Germany, Netherlands, Portugal, Spain, Great Britain, Norway, and Sweden were represented. The Conference discussed marketing problems arising from the present EEC negotiations and their effect on the fishing industry of the various countries.

The President of EUROPECHE, in his address to the conference, stressed the need for continued cooperation between fishery organizations of the member countries regardless of the outcome of the present trade-political developments in Europe. He stated that they should carefully study and observe these developments as the fishery organizations may have an opportunity to influence future market developments. The Scandinavian representatives indicated that they were of the opinion that the fishermen and fisheries organizations themselves could reach satisfactory agreements on their marketing problems, but inasmuch as the European fishing industry is only a small detail in the over-all EEC picture, that undoubtedly the final decisions affecting the industry would be made on a high political level.

In spite of the fact that the Conference did not result in any positive productive agreements, the question of territorial fishing limits was explored. During this discussion, it became apparent that if Sweden should fail to become associated with the Common Market, it would suffer with regard to its natural fishing area along the Norwegian coast. The EEC members have resisted any extension of territorial limits that would restrict the fishing rights of the member countries. It is the

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intent of the EEC that a three-mile limit with regard to fishing rights be applicable in all EEC countries for all EEC members. At the present time, Norway and Sweden have an agreement that Swedish fishermen must fish outside a twelve-mile limit along the Norwegian west coast. If this situation continues and Sweden does not associate with the Common Market, it will be placed in the unenviable position of fishing outside the twelve-mile limit while her competitors will have the privilege of fishing outside the three-mile limit along the Norwegian coast. This disadvantage could seriously impair the Swedish fishing industry, which is one of the most important industries on the west coast of Sweden.

Another topic that was discussed by the delegates concerned the North Sea-Atlantic Fishery Convention of 1959. It is hoped that this Convention can be placed in effect in 1963, but this will depend upon ratification by Ireland and West Germany, the only countries concerned that have failed to sign this Convention at the present time. When this Convention takes effect, a large international research program of the fishing industry is planned and will undoubtedly concern itself with the various problems that exist at the present time for the North Sea-Atlantic fishermen.

One positive action resulting from this Conference in Goteborg was a resolution that the delegates should alert their governments to the fact that the supply of herring in the North Sea has decreased this year. It was suggested that this might be the result of overfishing in that area. Another positive action taken at the Conference was the approval of an Italian application for membership, but there was no Italian representation at the meeting.

The West European Fishery Conference, originally founded by trawler organizations in Holland and England, serves as an information organization for the member countries. The Conference was hampered and prevented from accomplishing positive results by the unsettled situation surrounding the present EEC negotiations. Because of the present EEC negotiations being carried on by certain member countries, the delegates were reluctant to express their views or to commit themselves to any definite position, pending the outcome of the EEC negotiations.

The Conference next year will be held in Denmark, and if the present situation regarding EEC developments is settled, this Conference may prove to be of much greater value to the fishing industries in Western Europe. (United States Consulate, Goteborg, September 27, 1962.)

SCANDINAVIAN AND BRITISH FISHERIES ASSOCIATIONS MEET:

Representatives from fisheries associations of the United Kingdom, Norway, Sweden, and Denmark met in London in mid-September 1962 to discuss mutual problems, presumably connected primarily with Common Market developments, according to Danish newspaper reports. The Danish representatives, one from each of the two largest fishermen's associations, stated that the discussions were confidential commenting only that they were for orientation purposes and gave promise of future fruitful cooperation. (European Regional Fisheries Attache, United States Embassy, Copenhagen, September 26, 1962.)

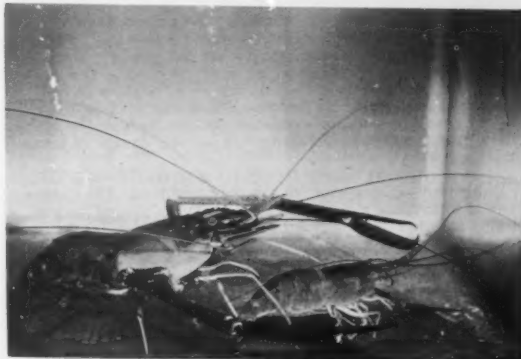
FOOD AND AGRICULTURE ORGANIZATION

ASIATIC FRESH-WATER SHRIMP CULTURE EXPERIMENTS SUCCESSFUL:

The giant fresh-water shrimp found throughout Asia has always been regarded as a choice food. In addition, nutritionists consider shrimp a high source of protein, and as such, would like to see more of it made available. Fresh-water shrimp supplies from the usual natural sources have always been scarce, and no one has yet been able to breed and grow them successfully in captivity.

Fishery scientists have for years been interested in shrimp farming, and some experiments already have been conducted in several Asiatic countries, Australia, the United States, and other countries. A fisheries biologist (Dr. Shao-Wen Ling) of the Food and Agriculture Organization, who has been experimenting in a laboratory at Penang, Malaya, is reported to have been successful in breeding and growing fresh-water shrimp.

The biggest problem in shrimp culture has always been that little is known about the biology and habits of the giant fresh-water shrimp, especially in its early stages. Baby



Larger of the two is an adult giant fresh-water shrimp (*Macrobrachium rosenbergi*) raised in a Malayan laboratory by a FAO biologist.

shrimp, or more properly larvae, are plentiful enough in their native habitat, but their growth has always been more or less guess work. By the time this variety of shrimp become fully grown, their numbers have always been drastically reduced. The FAO biologist, working on assignment with the Malayan Government, took two and a half years to learn about the growth of fresh-water shrimp.

For his experiments, the FAO biologist selected the giant Malayan fresh-water shrimp (*Macrobrachium rosenbergi*), which is also indigenous in the tropical waters of all countries of the Indo-Pacific region. His first problem was to find out something about the shrimp's actual reproductive habits. Observations showed that mating would occur only if the female was in the very short and specific mating condition. Only then would mating take place. After mating, the male would protect the female from all comers, instead of attacking her. Next, it was necessary to study the best conditions under which eggs, after a long incubation period, would hatch into healthy larvae.

Despite the apparent success to that point, it was only the beginning. The main task was to develop ways and means of growing the larval shrimp to maturity. At first, the thousands of larvae produced in the laboratory were reared in fresh-water but they all died within 4 to 5 days

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after hatching. Similar failures occurred repeatedly for more than six months. The thought occurred that perhaps in their natural habitat the new-born shrimp moved to different waters. Perhaps they moved downstream to where the river was influenced by the tides and became more brackish water. The scientist then decided to add a small amount of sea water to the fresh water, and soon young larvae were kept living for as long as a week. But since it takes almost a year for a baby shrimp to become an adult, he started again with water of higher salinity and found that the shrimp lived a little longer. The experiments continued in that manner until he found that by gradually increasing the salinity of the water, he could make them live longer. But each failure meant starting all over again, and it took two years to grow the baby shrimp up from larvae to the juvenile stage, and from the juvenile to adult stage.

Meanwhile, each larva had gone through 15 different moulting periods before it grew into a juvenile, and the water had been increased in salinity until it contained 40 percent sea water. After that, it was discovered that the juveniles put back into fresh water survived quite successfully.

As a result of these experiments, the scientist was led to believe that the larvae hatch upriver in fresh water, and then gradually move downriver toward the sea until they become juveniles in brackish water near the coast. The juvenile shrimp then move back up the river to grow to full size and breed again. At that stage they can survive in rivers, canals, ponds, or even rice fields. In fact, the fully-grown giant fresh-water shrimp are usually caught in those places.

But water salinity was not the only problem. The scientist had to find the right kinds of food, and a proper way of feeding the shrimp. He tried many foods and feeding techniques, and even imported the eggs of the *Artemia* or brine shrimp. These were hatched out and fed to the young shrimp larvae. This appeared to work out very well but was not economically practical because of the high cost. Local ocean zooplankton was tried as a food but this also proved impractical. Better results were obtained from using fish eggs, which the shrimp seemed to like, but even these were too expensive.

A simple and uncomplicated solution to the food problem was finally found. Any day in the Penang Market, as in most markets in that region, fish balls (made up of finely ground fish) can be bought. The scientist discovered that when these were broken up, they made an excellent and very cheap food for the young larval shrimp. The standard practice of feeding, he believes, will be to feed fish eggs to the very young larvae, and then, as they get larger, change their diet to crushed fish balls, with *Artemia* as a supplementary food.

The over-all problem, even at that stage, was not completely solved. While the experiments were successful under laboratory conditions, the objective was to breed shrimp on a large scale, and to achieve a process that was simple and standardized. That was the final stage of the scientist's experimental studies. He found that the problem of increasing salinity was comparatively simple. If the hatchlings or larvae were reared in large open containers, the normal evaporation process would increase the salt content, and it would require very little control by the operator who would only need to add a little fresh or salt water to keep it constant.

The scientist gradually reduced the feeding process to a set routine. Now he believes that with a little more improvement, it will be possible to evolve a simple and practical method for almost anyone, with some training, to culture giant fresh-water shrimp.

The FAO scientist believes that, in the near future, the Asian farmwife or fishermen's wife should be able to raise

and keep shrimp just as easily and profitably as the European farmwife keeps hens. (News release, September 20, 1962, Food and Agriculture Organization, Rome.)

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FAO REQUESTS FUNDS FOR CENTRAL AMERICA FISHING INDUSTRY STUDY:

The Food and Agriculture Organization (FAO) has requested a \$2 million grant from the United Nations special fund for a three-phase regional study of the fishing industry in Central America: (1) exploration of the fish resources of Central American waters (Pacific and Caribbean); (2) possibilities of commercialization of an expanded fishing catch; (3) possibilities of industrialization, particularly canning and byproducts.

The FAO plan calls for 10 to 15 experts, some of whom would be expected to arrive in Central America in June 1963, if the project is approved and the necessary funds appropriated. (October 16, 1962, report from Guatemala.)

INTERNATIONAL ASSOCIATION OF FISH MEAL MANUFACTURERS

REPORT ON THIRD ANNUAL CONFERENCE:

Over 100 delegates and observers from 18 countries representing the principal fish meal producers in the world attended the Third Annual Conference of the International Association of Fish Meal Manufacturers (IAFMM) in London, October 9-12, 1962. Twenty-five prominent scientists from France, Germany, Iceland, Norway, Peru, Portugal, South Africa, Spain, the United States, United Kingdom, and the Argentine, as well as from the Food and Agriculture Organization (FAO) held detailed discussions on a wide range of topics of importance to the industry, among them: achieving uniform methods of analysis, nutritional matters, the use of fish oil in animal feeding, and scientific methods of promotion of increased usage of fish meal.

Manufacturers and scientists considered together matters which had been discussed at the Scientific Meetings, with particular reference to their commercial application. Other matters discussed were increase of world markets; promotion methods, particularly in underdeveloped markets or countries; expanded advisory services generally; and various nutritional matters. The Conference

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received full reports from the U. S. Bureau of Commercial Fisheries on work on fish protein concentrate (fish flour) about to be undertaken in the United States; and from FAO on a large-scale pilot scheme for feeding fish protein concentrate, about to start in Peru.

Problems relating to analytical methods and quality standards in the European Common Market were discussed. FAO is preparing a new and revised edition of its publication "Animal Feedstuffs--Regulations Governing their Manufacture and Sale in European Countries." During the coming year IAFMM will consider participation in the Freedom from Hunger Campaign and the World Food Congress in 1963. It endorsed and welcomed the objects of the Campaign and the Congress.

A total of 13 national associations and 12 individual companies (in Denmark, Sweden, and the United States) belong to the IAFMM. Observers present were from the Argentine, Chile, Japan, the Fishmeal Exporters Organization (FEO), FAO, the U. S. Bureau of Commercial Fisheries, and the United States Embassy, Copenhagen. More than half of the United States companies belonging to IAFMM were represented.

A summary of the more important matters discussed in the General and Scientific Committee sessions follows.

Meeting with Brokers, Agents and Importers: An FEO member initiated the discussion by giving world figures for production of fish meal as 2,550,000 metric tons in 1961 and 2,700,000 tons in 1962 with production and demand about in balance. FEO quotas for 1963 were stated to be the same as the physical exports in 1962.

On promotional problems it was deemed helpful to summarize and circulate what had been done in various countries, and brokers, agents, and importers were asked to submit suggestions for promotion in their countries to IAFMM and FEO for consideration.

Promotion of Increased Usage of Fish Meal: FEO had decided to finance the employment of one or two experts, but was having difficulty finding the right man.

There was no urgent need for an advanced brochure on fish meal usage, but a Norwegian scientist and a British scientist were preparing a "Summary of Past Research on the Use of Fish Meal in Poultry Nutrition," to be ready by March 1, 1963.

Feeding Trials: There is a more urgent need for further analytical work on fish meal than for further feeding trials with computed rations. It is also important to be able to distinguish a good meal from a poor one and to control the quality of the meal used in trials. Some compounders deliberately discount part of the nutrient content of fish meal on the basis of incomplete availability, but make no such deduction for soybean meal. An example is the methionine content of menhaden meal.

Analytical Methods: Discussion centered on fat determination and pepsin digestibility. For the former a strong case was made for limiting it to fat extractable with hexane or ether, and discarding methods for total fat including the badly oxidized fat. The practical significance of the latter is uncertain, and some further studies on it are in progress.

Pepsin digestibility is plagued by extreme differences in technique in different countries and the results do not correlate satisfactorily with protein quality. It would be better to abandon this test in favor of the available lysine test. However, no single amino acid is an infallible index for all others and a routine method for available methionine would be particularly helpful.

Antioxidants: There was considerable discussion as to whether oxidation of the oil in meal should be promoted, rather than hindered by addition of an antioxidant. In South Africa deliberate oxidation by heat curing is advocated to prevent later spontaneous heating. This is claimed not to reduce the nutritional value of the protein but others were concerned about oxidation products which can react with lysine and lower its availability. It was reported that contrary to earlier belief the phospholipids in fish meal do not oxidize as readily as the true fat. Solubles added to meal reduce the extent of damage if the meal is overheated. This may be because certain constituents of the solubles reinforce the action of natural antioxidants in the meal. Retention of meal for a somewhat longer time in the drier re-

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duces the extent of any later spontaneous heating.

Fish Oils: Much work is going on in the United States on the use of menhaden oil in poultry nutrition. Much of it is confidential, being done by individual companies. High quality of the oil used is absolutely vital, but with good oil part or all of the fat added to the ration can be replaced by fish oil. On a calorie basis fish oil is superior to tallow and similar fatty materials now used and with broilers there is a growth response as a bonus. This feedingstuff outlet is far more important potentially than the outlet for hydrogenated fats in human use. In another direction, products prepared from fish oil can be used to alter the rumen metabolism in dairy cows to give a higher milk yield at the same food consumption. The characteristic of such foods as eggs and milk can be favorably altered by judicious use of fish oils and products made from fish oils. The unique chemical character of fish oils should be regarded as an asset rather than a disadvantage.

Fish Protein Concentrate: The Conference was fully informed of the latest developments in the United States, including distribution of a newly-issued series of leaflets issued by the U. S. Bureau of Commercial Fisheries.

The FAO observer also reported to the meeting on a large-scale pilot scheme for feeding fish protein concentrate which had been requested by the Peruvian Government and which should commence soon. Some of the initial supplies would be made available from South Africa and Chile. The Peruvian fish meal manufacturers were assisting financially and were also developing a suitable product.

Next Conference and Meetings: The IAFMM was invited to hold its Fourth Annual Conference in Lima, Peru, by the Peruvian member. The invitation will be considered at the next Executive Council Meeting. At previous Conferences there has been some doubt about meeting in either Peru or South Africa because of the travel involved for most members. Executive Council and Scientific Committee meeting dates were left to be established by the executive

officers and Director. (Regional Fisheries Attache for Europe, United States Embassy, October 24, 1962.)

Note: See Commercial Fisheries Review, September 1962 p. 56, April 1962 p. 37.

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

RESULTS AND RECOMMENDATIONS OF SECOND SESSION:

The International Cooperative Investigation of the Tropical Atlantic (ICITA) was approved by the Intergovernmental Oceanographic Commission (IOC) at its second session held in Paris, September 20-28, 1962. Also approved was the participation in IOC meetings of any research organization, such as the International North Pacific Fisheries Commission.

One of the resolutions passed at the meeting was the recommendation that fisheries work be considered a part of the International Indian Ocean Expedition.

Note: See Commercial Fisheries Review, November 1962 p. 58.

INDO-PACIFIC FISHERIES COUNCIL

TENTH SESSION HELD IN SEOUL:

The Tenth Session of the Indo-Pacific Fisheries Council was held in Seoul, Korea, October 10-25, 1962. Representatives from 14 of the 17 member countries attended, including a United States delegate from the Bureau of Commercial Fisheries.

The Tenth Session was devoted to discussions on improvements in the fishery industries, and included both marketing and biological aspects.

The Koreans were especially interested in this conference from a technical point of view as their fishing industry holds a good potential for increasing the country's exports. Broadening the scope of their fishery activities, and participation in international conferences on the fisheries has been of particular interest to the Koreans.

The functions of the Indo-Pacific Fisheries Council are: (1) to assemble and disseminate technical information on aquatic resources, (2) to encourage and coordinate research along those lines, and (3) to recommend development programs, as they become necessary, to member governments. (Bi-weekly Economic Review No. 21, October 6-19, 1962.)

International (Contd.):

FISH MEAL

WORLD PRODUCTION,
AUGUST 1962:

According to preliminary data from the International Association of Fish Meal Manufacturers, world production of fish meal in August 1962 amounted to about 178,151 metric tons, an increase of 10.4 percent over world production in August 1961.

Most of the principal countries producing fish meal submit data to the Association monthly (see table).

World Fish Meal Production by Countries, August 1962

Country	August		Jan.-Aug.
	1962	1961	1962
.... (Metric Tons)			
Canada	3,420	4,378	52,613
Denmark	10,365	9,066	60,935
France	1,100	1,100	8,800
German Federal Republic ..	6,922	6,727	50,239
Netherlands	1/	700	1/2,400
Spain	1,954	1,849	17,783
Sweden	253	329	2,759
United Kingdom	6,544	6,503	51,479
United States	35,336	52,191	186,771
Angola	1/	5,125	1/15,657
Iceland	29,155	11,532	80,579
Norway	18,726	10,626	85,904
Peru	52,716	38,319	662,874
South Africa (including South-West Africa)	11,660	12,900	191,976
Total	178,151	161,345	1,470,769

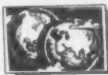
1/ Data not available for August; data revised for January-July.

Note: Belgium, Chile, Japan, and Morocco do not report their fish meal production to the International Association of Fish Meal Manufacturers at present.

The increase in world fish meal production this August was due mainly to more output in Peru (up 37.6 percent), Iceland (up 152.8 percent), Norway (up 76.2 percent), and Denmark (up 14.3 percent). This year through August, Peru had increased landings of anchoveta, Iceland and Norway had record landings of summer herring, and Denmark's landings of industrial fish were up. The increase was offset partly by a drop of 32.3 percent in fish meal production in the United States. The menhaden catch in the United States in August 1962 was down sharply in the New England, Middle Atlantic, and Gulf States.

Peru accounted for 29.6 percent of world fish meal production (for countries listed) in August 1962, followed by the United States with 19.8 percent, and Iceland with 16.4 percent.

During the first eight months of 1962, Peru accounted for 45.1 percent of total fish meal production, followed by South Africa with 13.1 percent, and the United States with 12.7 percent.



Argentine Republic

JOINT JAPANESE-ARGENTINE
TUNA FISHING VENTURE:

A Japanese company late in August 1962 was reported planning to dispatch its

tuna vessel Eikyo Maru (270 tons) to fish tuna jointly with a local firm in Argentina. The plan hinged on obtaining permission from the local government and completion of necessary arrangements. The application filed by the Japanese firm was approved by the Japanese Overseas Investment Liaison Council. The Eikyo Maru's departure was expected at the end of August or the first part of September 1962. (Suisan Tsushin, August 25, 1962.)



Australia

WESTERN AUSTRALIA BEGINS
EXPORT OF SHRIMP:

An initial shipment of 8,000 pounds of "tiger" shrimp from Western Australia's new Shark Bay shrimp fishery has been consigned to the United States. The shrimp were cooked and packed at sea. They averaged 7 inches in length. Shrimp from Shark Bay are counting 15 to 16 (heads-off) to the pound. The "tiger" shrimp will also be exported to France as "prawns."

The new Shark Bay shrimp fishery is based at Carnarvon. No local fishing vessels will be allowed to fish in the area without the approval of the Fisheries Department because the Government wishes to avoid overfishing. The Western Australian Government has stated that shrimp trawlers from other Australian States will not be allowed to fish in Shark Bay unless the vessels are purchased by or chartered to approved fishermen. The statement was made after a Queensland seafood processor said that some 50 trawlers might be sent from Sydney to Western Australia.

The shrimp industry on the east coast of Australia is well developed and employs 300 boats. The possibility that the shrimp potential in waters off the West Coast may equal that of the East Coast has stirred considerable interest.

A Tasmanian fisherman recently returned from Japan with a description of Japanese shrimp fishing methods in the East China Sea. He said the Japanese have equipment which tells fishermen the exact depth at which a shrimp net is fishing and just how the net mouth is open.

Australian shrimp fishermen are seeking tariff protection from shrimp meat imported

Australia (Contd.):

from India, China, and Japan. (The Fishing News, September 7, 1962.)

FISHERIES RESEARCH, DEVELOPMENT, AND ADMINISTRATION DISCUSSED:

A series of proposals on fisheries research, development, and administration were discussed at a meeting of the Australian Fisheries Council in October 1962. Attending the meeting were the six State Ministers responsible for fisheries, and the Commonwealth Ministers for Territories and Primary Industry. The two remaining members (the Minister for Trade, and the Minister for the Commonwealth Industrial and Scientific Research Organization) of the Council were not in attendance.

The meeting discussed the necessity for uniform regulations for the management of fisheries, with special attention given to the spiny lobster or crayfish industry of the southeastern coast. This proposal was referred for study to a special meeting in the near future of representatives of the states of New South Wales, Victoria, Tasmania, and South Australia, the Commonwealth Scientific and Industrial Research Organization, and the Department of Primary Industry.

The Ministers agreed to continue training courses for fisheries field officers, and to provide additional information on the fishing industry essential for efficient administration and research. It was also agreed to request the Department of Primary Industry and the Commonwealth Scientific and Industrial Research Organization to do research on the problems of handling, transportation, storage, and processing of fish and to investigate the requirements for fishing gear in Australia. The meeting also agreed to take action against noxious fish, especially the European carp.

The Minister for Primary Industry advised the meeting that funds would be provided to finance an earlier proposal by the Ministers to sponsor a visit to Australia by an expert on fishing boat design, to consult with the industry in all states and New Guinea.

In the opening address, the Chairman of the conference, the Minister for Primary

Industry, reviewed highlights of Australia's fisheries production in fiscal year 1961/62.

Spiny Lobster: Production reached 27.9 million pounds, only a small increase over 1960/61. Of the total fisheries exports for the year, 96 percent by value was spiny lobster, of which the great proportion was sent to the United States. There has been little change in spiny lobster production in the last three years.

Tuna: The Australian catch in 1961/62 totaled 5,457 metric tons, a new record and an increase of 12 percent over the previous year. Experimental tuna fishing off the southwest Australian coast failed to find tuna in commercial quantities. The domestic industry was further protected in 1961 from tuna imports, mainly from Japan, by a tariff increase for the most favored nation category. Despite the increase; however, imports of canned tuna have continued to rise.

Salmon-Trout: A record canned pack of 5.8 million pounds in 1961/62 showed a considerable improvement over the previous year.

Oysters: Production increased by nine percent in 1960/61 for a total of over 14 million pounds.

Imports of fishery products were still high in 1961/62 at £A8.5 million, but were below the level of the previous year of £A9.7 million. This reduction occurred primarily in canned products and was only partially offset by a small increase in frozen fish imports. (United States Embassy, Canberra, October 12, 1962.)

TAGGING RESULTS IN AUSTRALIAN WATERS:

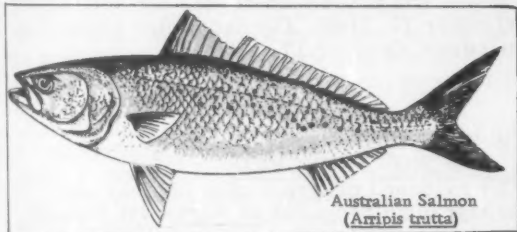
Twelve different tags or marks have been applied to 183,113 aquatic animals (whales, fish, crustacea, and shellfish) in Australian waters. Recoveries as of mid-1962 total 9,918 (5.5 percent). This is stated by the CSIRO Division of Fisheries and Oceanography.

Bluefin Tuna: The information on movements is not clear-cut, except that one fish was recaptured in South Australian waters some hundreds of miles from the tagging place off southern New South Wales, indicating that the southern and eastern stocks may be one.

Australian (Contd.):

Sea Mullet: The sea mullet program has been very successful in showing the pattern both of short-term local movements and longer-term migration paths. Valuable data on growth rates have been obtained. The Queensland study shows movements at the northern end of the mullet's range consistent with the pattern further south indicating that the adult mullet do not return southwards. There were no returns from the South Australian study, so no proof of either independence or homogeneity with eastern or western stocks has been obtained.

Australian Salmon (Trout): The tagging program has shown conclusively that the two stocks or subspecies mingle in the nursery areas of Bass Strait, but that, as maturity



nears, the western subspecies moves westward along the coast of South Australia to Western Australia where it spawns, whereas the eastern subspecies remains in the vicinity of the eastern end of Bass Strait and spawns off southeastern Australia.

School Shark: The pattern of movements of young and adult sharks in the southeastern Australian waters has been demonstrated. The school sharks of South Australian, Victorian, Tasmanian, and New South Wales waters form one intermingling stock, with free interchange across the range of distribution. It is not known to what extent there is continuity with the school sharks of southwestern Australia, because no fishery for the species exists in that area.

Western Spiny Lobster: Punch marking of western spiny lobsters proved beyond any doubt the fact believed by scientists on anatomical grounds, but disbelieved by a majority of fishermen, that the white spiny lobster are a growth phase of the normal red type. Continuous fishing tests to estimate the intensity of fishing have been carried out suc-

cessfully and data on short- and long-term movements have accumulated.



Two specimens of Australian spiny lobster.

Humpback Whales: Whale marking has shown that some degree of intermingling takes place between two humpback populations previously considered to be distinct. (Australian Fisheries Newsletter, September 1962.)



Brazil

NEW SHRIMP PROCESSING AND EXPORTING COMPANY:

The establishment of a shrimp processing and export company in Paranagua on the southeastern coast of Brazil is being considered by a Brazilian group. The Brazilian group is seeking financing for the proposed new shrimp company, according to Curitiba newspaper reports of September 4, 1962. The Governor of Parana State, Brazil, has been informed of the technical plans for the new shrimp company. (United States Consulate, Curitiba, October 5, 1962.)



Canada

FROZEN FISH TRADE MISSION TO EUROPE:

Seven members of the Canadian frozen fish industry left Ottawa on September 28, 1962, on a 5-week Frozen Fish Trade Mission to Europe. The main purpose of the mission is to examine in detail the European market for frozen fishery products. It is also hoped that the mission will focus the attention of European buyers on Canada as a dependable supplier of top-quality frozen fish, according to a press release by the Canadian Minister of Trade and Commerce of September 26, 1962. With the cooperation of Canadian Trade Commissioners in London, Paris, Hamburg, and Rome, members of the mission will visit leading importers of fishery products and government fisheries officers in important market and producing centers. The members of the mission will also see processing methods now used by frozen fish plants in Europe. The salt-fish industry will be examined briefly by visits to salt-fish plants in France and salt-fish importers in Italy.

The mission includes frozen fish industry representatives from the Provinces of Newfoundland, Nova Scotia, Quebec, and British Columbia, as well as a representative of the Canadian Labor Congress. The mission will be accompanied by a member of the Economics Service of the Canadian Department of Fisheries, and the Chief of the Fisheries Division in the Agriculture and Fisheries Branch, Department of Trade and Commerce, Ottawa.

Expanding European markets are open to Canadian frozen fish processors, the Minister of Trade and Commerce pointed out in announcing the mission. The United Kingdom removed import restrictions on fresh and frozen fish late in 1959. Canadian sales of frozen cod fillets and blocks to the United Kingdom jumped from 1.1 million pounds in 1960 to nearly 7 million pounds in 1961 and may set new records this year. The sale of frozen foods has greatly increased in other European countries and importers have shown considerable interest in Canadian quality fish products. (United States Embassy, Ottawa, October 1, 1962.)

PRICE DISAGREEMENT TIES UP BRITISH COLUMBIA HERRING FLEET:

About 80 British Columbia herring fishing vessels tied up on October 16, 1962, when some 640 Vancouver fishermen were idled because of disagreement on prices for the new herring fishing season. The fishermen want an ex-vessel price of \$16.00 a short ton for seine-caught herring going into reduction and \$20.00 a ton (or 1 cent a pound) for herring sold as food fish (for canning, salting, and other purposes). Also \$30.43 a ton for trawl-caught herring for reduction purposes but to include all costs of fuel, vessel, and net shares.

The British Columbia Fisheries Association has offered the same prices paid the herring fishermen last season--\$10.40 a ton for reduction herring, and \$16.00 for herring used as food. The price dispute was not settled as of October 17, 1962. (United States Consulate, Vancouver, October 17, 1962.)

NEW RESEARCH VESSEL "G. B. REED" LAUNCHED:

A broadened program of biological and oceanographic research in Northeast Pacific waters was envisaged at the launching in the summer of 1962 of the G. B. Reed, Canada's first large fisheries research vessel on the Pacific coast. The G. B. Reed is a sister-ship to the A. T. Cameron, in service on the Northwest Atlantic. Both vessels are operated by the Fisheries Research Board of Canada.

While smaller vessels have for several years provided yeoman service to the Board's biological station and oceanographic unit at Nanaimo, B. C., this service has been limited by the vessels' range, accommodations, and scientific facilities. The G. B. Reed will give vastly improved conditions. She will have a cruising range of 8,500 miles; accommodations for nine scientists; and five laboratories furnished with the latest in scientific paraphernalia.

The Director of the Nanaimo Biological Station at the launching ceremony said the construction of the new research vessel was a sign of the times. "All over the world nations are looking more and more to the sea for the food supplies of the future. Canada

Canada (Contd.):

is no exception. We have a very real stake in the resources off our coasts . . . there can be no doubt of our long-term interest in these resources, and no doubt of our increasing use of them."

Canadian fisheries research in the Pacific has expanded seaward particularly since 1953 when Canada became a member of the International North Pacific Fisheries Commission. Biological and oceanographic investigations on the high seas have produced "exciting new knowledge of where our salmon are" and have turned the northeast Pacific from one of the least known to one of the best known oceans in the world, said the Director. ". . . But we have only scratched the surface. There is still much more that is mysterious than is known in the ocean. Not only our own scientific curiosity but the pressure of economic and international problems urges us to turn ignorance of the ocean's resources into useful knowledge. The G. B. Reed will help us to do this."

Immediate plans for the G. B. Reed include a first look at the groundfish stocks in the northeast Pacific, where an international trawl fishery seems imminent. Future projects in which the new research vessel will figure may include studies of high-seas distribution of salmon stocks and ocean productivity. The vessel will also be used in exploratory fishing operations which may reveal new fisheries resources capable of supporting commercial operations.

The G. B. Reed has an over-all length of 177 feet, a breadth of 32 feet, and a loaded draft of 12 feet 10 inches. Her design is similar to east coast commercial trawlers whose sturdy, dependable characteristics under virtually all weather conditions are favorably known. In place of the usual large fish hold, the G. B. Reed is equipped with laboratories and electronic equipment. She also has special fishing gear, winches, and rigging enabling her to carry out a wide variety of exploratory fishing operations. She will carry a complement of 36, including crew and scientific personnel. Her hull is constructed of stiffened steel while the superstructure is aluminum. (Trade News, September 1962.)

Note: See Commercial Fisheries Review, February 1962 p. 62.

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PACIFIC SALMON TAGGING:

Field operations by the four vessels chartered by the Fisheries Research Board of Canada for tagging Pacific salmon on the high seas were concluded by August 1962. Between early April and late July the vessels, using Japanese long-line gear, caught 19,500 salmon, of which 17,500 were tagged and released. All species of Pacific salmon, plus steelheads, are represented in the figures. Through August and early September 1962 more than 300 tags had been returned to the Research Board's Biological Station at Nanaimo, B.C., from localities extending from the Columbia River to Western Alaska.

Very small hooks are used to catch the fish for tagging, so that they can be released in good condition. The amount of information that can be obtained from this large program and especially the knowledge of the whereabouts of the major British Columbia salmon stocks in the ocean will depend to a great extent on the cooperation of all those who find tags. Fishermen, shoreworkers, and others are invited and urged to play their part in this important program by turning in all tags promptly to the Research Board's Biological Station at Nanaimo, to fisheries officers, or to cannery bookkeepers. (Trade News, September 1962, Canada's Department of Fisheries.)



Ceylon

FISHERY TRENDS AND FOREIGN INVESTMENT POSSIBILITIES:

There may be opportunities for carefully planned investments by United States firms in Ceylon's changing fishing industry. Such investments would involve some unknown factors which would need careful examination. Ceylon may have abundant fishery resources, but they are largely unexplored. In 1960, Ceylonese landings totaled only 48,222 metric tons, while imports of fishery products amounted to 132,341 tons. The policy of the Government of Ceylon in regard to nationalization of businesses and repatriation of investments and profits is not clearly known and would need careful study by potential investors.

The Government of Ceylon is interested in foreign investments that would bring modern fishing equipment and technical skill to Ceylon. The Government hopes the Ceylonese can learn modern fishing techniques through participation in joint fishing ventures with foreign firms. The Government is aware of the need for regulations which will permit business interests to operate without undue restrictions. Some Ceylonese groups have shown an interest in joining with American firms to carry on fishery operations.

The Director of Ceylon's Fisheries Department has stated that his department will assist potential foreign investors in investigating fishery opportunities in Ceylon. The present Government budget includes a request for a 70-foot fishery

Ceylon (Contd.):



FAO fishery expert back in 1955 views some of the outriggers still used by fishermen on Ceylon's east coast.

research vessel. It is estimated that the vessel would cost Rs. 500,000 (US\$105,130). It would be capable of carrying out research and exploratory fishing in waters up to 400 miles from Ceylon. The Fisheries Department has been limited in the past by a shortage of research equipment.

A shortage of harbors has handicapped fisheries development in Ceylon. The Port Commission of Ceylon is building a harbor at Galle that will have 1,200 feet of alongside dock space for fishing vessels needing less than 20 feet of water. According to news reports, the Government plans to build 16 other new harbors. The minimum construction time for the 16 new harbors is estimated at from 2 to 3 years.

Ceylon has sought foreign aid in developing Galle harbor as a base for a tuna long-line fishing venture. It was hoped that a foreign investor would develop shore facilities at Galle for processing fish, furnish vessels, train the Ceylonese in modern fishing techniques, and eventually transfer all interest in the venture to the Ceylonese. The response to the Galle proposal is not known.

Ceylon has cold-storage facilities at Mutwal where two trawlers are based. According to a recent Government report, the cold-storage facilities at Mutwal must be expanded if additional trawlers are to be accommodated. Negotiations were reported to be taking place with Poland and Yugoslavia for the purchase of five trawlers, but it was later reported that the purchase may be limited to one under Yugoslav credit.

A United States company that wishes to import frozen spiny lobster tails from Ceylon has been negotiating a limited joint venture with a private Ceylonese group. The abundance of spiny lobsters in Ceylon's coastal waters is the subject of conflicting reports.

The joint firm formed by Japanese and Ceylonese interests in 1961 is now engaging in tuna fishing. The tuna is sold in Ceylon as fresh fish, but the company is completing its own freezing plant and will later undertake canning. The Japanese also fish independently in waters accessible to Ceylon and take the fish to Japan for processing and export.

In May 1962, a representative of a British firm was in Ceylon surveying the opportunities for bringing vessels and equipment to fish Ceylonese waters. He was quoted in the press as being impressed, but nothing further had developed as of mid-September 1962.

Ceylon's Fisheries Department is heavily involved in administering the mechanized vessel plan which is now in its

fourth year of operation. The United States Agency for International Development (AID) has provided Rs. 2,300,000 (US\$483,600) in local currency to support the plan. Under the plan, the Government finances the building and equipping of small 2-ton mechanized boats suitable for fishing the nearby waters. A total of 1,189 had been built by September 1962 at an average cost of Rs. 17,500 (US\$3,680) per boat including gear. The range of operation is considerably more than that of the native outrigger nonmechanized craft. In addition, there is a plan for providing outboard motors for 300 traditional craft per year.

While fish catches have increased, the increase has not met expectations and there have been many problems of boat maintenance and operation. Many borrowers have not carried through with their loan agreement. Some consideration has been given to reducing the rate of repayment. A factor in the rate of repayment is that the fisherman considers the loan in the nature of a subsidy from the Government. The rate of recovery reported for loans made in 1958-59 is 31.6 percent. The record for succeeding years ranges from 16 to 18 percent. Present plans call for more vigorous efforts to inspect vessel operations and supervise loan collections. (United States Embassy, Colombia, August 24 and September 17, 1962.)



Chile

FISHERIES TRENDS, SEPTEMBER 1962:

Fish Meal Industry Continues to Expand: Corporacion de Fomento de la Produccion de Chile (CORFO) is studying a proposal by a foreign concern to invest up to US\$5 million in a new fish meal plant at Arica.



Crew of Chilean fishing trawler lowering their net off of Valparaiso.

In September 1962, two new fish meal plants began operating on an experimental basis in northern Chile. They are expected to start full production upon completion of machinery tests and clearance by national

Chile (Contd.):

health authorities. One of the new plants is located in Iquique and reportedly represents an investment of about US\$1 million. With full production it should be able to process 400 metric tons of anchovies daily. Raw material will be supplied by a fleet of eight fishing vessels of 110-ton capacity. Two of the vessels were due to arrive in Iquique during September.

The other new plant is located in Pisagua. It represents a joint venture of Chilean and Norwegian capital reportedly amounting to more than US\$1 million. The plant will process fish meal and will freeze fish products for sale in local and foreign markets. It will have an average operating capacity of 60 tons of raw material per hour. Raw material is presently being supplied by the Norwegian fishing vessel *Senior* (400 tons). Additional fishing vessels are due to arrive from Norway in 1963.

CORFO announced in late August 1962 the approval of new loans valued at over US\$2,135,400 for the installation of other new fish meal plants in Iquique and Arica and the purchase of a number of 100-ton fishing vessels to supply the plants. The loans will include United States dollar credits of \$240,000 and the balance will be extended in Chilean currency.

Proposal to Resettle Some Italian Fishermen in Chile: During September 1962, representatives of the Food and Agriculture Organization (FAO) visited Northern Chile to study the possibility of settling Italian fishermen at ports in the area. There has been, as yet, little reaction to the proposal. The FAO representatives stated that the Italian fishermen would not displace Chileans and would not engage in any business except fishing. (United States Consulate, Antofagasta, September 28, 1962.)



Denmark

FISH FILLETS AND BLOCKS
AND FISHERY INDUSTRIAL PRODUCTS
EXPORTS, JANUARY-AUGUST 1962:

Denmark's exports of fresh and frozen fillets and blocks during the first eight months of this year were 17.1 percent greater than in the same period of 1961, mainly because of an increase of 132.8 percent in exports of herring fillets. Exports of flounder and sole fillets increased 14.8 percent,

but exports of cod and related species declined 7.5 percent. During the first eight months of this year exports to the United States of fresh and frozen fillets and blocks of about 9.6 million pounds (mostly cod and related species) were up from the exports of about 9.2 million pounds in the same period of 1961.

Denmark's exports of fresh and frozen fish fillets and blocks during August 1962 were 14.8 percent above exports in the same month in 1961. Of the total exports, about 0.5 million pounds (mostly cod and related species) were shipped to the United States in August 1962 as against 0.3 million pounds in the same month of 1961. The leading buyers of frozen fillets in August 1962 were the United Kingdom and the Federal Republic of Germany.

Denmark's Exports of Fresh and Frozen Fish Fillets and Blocks and Fishery Industrial Products, Jan.-Aug. 1962^{1/}

Product	August		Jan.-Aug.	
	1962	1961	1962	1961
..... (1,000 Lbs.)				
Fillets and Blocks:				
Cod and related species ..	1,451	1,597	22,577	24,396
Flounder and sole	3,330	2,761	17,898	15,612
Herring	1,891	1,421	13,942	5,988
Other	30	59	477	887
Total	6,702	5,838	54,894	46,883
..... (Short Tons)				
Industrial Products:				
Fish meal, fish solubles, and similar products ...	9,524	6,750	48,655	27,618
^{1/} Shipments from the Faroe Islands and Greenland direct to foreign countries not included.				

Denmark's exports of fish meal, fish solubles, and similar products in January-August 1962 were 76.2 percent greater than in the same period a year earlier. Exports to the United States during the same period were 110 tons in 1962 as against 28 tons in 1961.

During August 1962, Denmark's exports of fish meal, fish solubles, and similar products were 41.1 percent above the amount shipped out in the same month of 1961. The principal buyers were the United Kingdom and West Germany. Only 110 tons were shipped to the United States.

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U. S. MAY GET FILLETS FORMERLY
SOLD TO EAST GERMANY:

Denmark's annual sale of about 2.2 million pounds of frozen cod fillets to East Germany will not occur this winter. The Danish delegation returning from negotiations in Leipzig late in September 1962, reported that the East Germans refused to pay any increase over the prices in the previous contracts. These prices will not cover their costs, according to the Danes.

Since Denmark has a good market for fillets in the United States and the United Kingdom, it is probable the quantity formerly going to East Germany will be diverted to those markets. Offsetting the loss of the East German market is the announcement that, during the winter, it is expected that the Blue Peter line, a German shipping firm, will maintain

Denmark (Contd.):

monthly refrigerated ship transport from Danish ports to the United States. Its vessels will carry poultry from the United States to Germany and frozen fish westbound. (European Regional Fisheries Attache, United States Embassy, Copenhagen, September 26, 1962.)

FISHERY EXPORTS,
JANUARY-AUGUST 1962:

Denmark's total exports of fishery products in the first eight months of 1962 were 22 percent greater in value than in the same period in 1961, the record year for exports. Similarly, exports to the United States were up about 20 percent in value. (European Regional Fisheries Attache, United States Embassy, Copenhagen, September 26, 1962.)

Danish Exports of Fishery Products, January-August 1962 and 1961						
Item	1962			1961		
	Qty.	Value		Qty.	Value	
	Metric Tons	Million Kr.	US\$ 1,000	Metric Tons	Million Kr.	US\$ 1,000
Total exports	190,100	356.6	51,707	167,500	291.9	42,326
Exports to U.S.	6,700	27.7	4,017	5,800	23.0	3,335

Note: Values converted at rate of one Danish kroner equals US\$0.145.

FISH-REDUCTION PLANT
ODOR CONTROL STUDIED:

Because of steadily increasing complaints to health commissions throughout Denmark and a request from the Ministry of Fisheries, the Akademiet for de Tekniske Videnskaber (The Academy for the Technical Sciences) in Copenhagen established a Fiskelugtudvalg (Fish Odor Committee) in 1956 to investigate the odor problems arising during the manufacture of fish meal and fish oil, the United States Regional Fisheries Attache in Europe reports. The Committee's objective was to obtain information on odor elimination in Denmark and foreign countries and to conduct research to the degree that proposals could be made for effective odor control. The Committee's work was completed earlier this year in the form of a report and the construction of a deodorizing installation in a small Danish fish-reduction plant which operates satisfactorily by burning the odor-containing gases. Also initiated was further experimentation, still under way, in Denmark's largest fish-reduction plant, located in Esbjerg.

The Committee's report, published by the Academy, is entitled *Bekæmpelse af Lugtplage* (Fight against Odor Problems). It is a 167-page, illustrated, mimeographed report in Danish, containing 13 chapters and a list of 81 references on odors and odor elimination. The various chapters discuss such matters as: physiology of the sense of smell; fish odors; research on properties of fish odors; fish meal manufacture and sources of odors; diffusion of odors; deodorizing methods; deodorizing by burning; experiences with an experimental odor-burning installation; subjective examination of odors in plant area; deodorizing of raw material storage bins; design of odor-burning and deodorizing installations; absorption of fish odors.

In a summary, the Committee estimated that, in a plant, 60-80 percent of the odors came from the drying operation, 10-20 percent from the cooking operation, the same percent-

age from internal transportation of the raw material, and 2-5 percent from particles of dried meal in the air. Burning the odor-containing gases from plant operations appeared to be the cheapest solution to the odor problem. The Committee also stressed the need for controlling odors during the unloading and storage of raw material, suggesting future research in this field. Raising the quality of the raw material to that of fish for human consumption was mentioned as the most effective control method but recognized as not currently possible. Greater use of ice and other preservatives was recommended. It was stated that deodorizing methods capable of handling very large quantities of gases should be developed, and absorption in sodium hypochlorite offered significant possibilities. Odor control in the recently-installed spray-drying plants was reported to be the subject of a joint study by the Ministry of Fisheries and Denmark's largest reduction plant in Esbjerg.

Advances in odor suppression in fish meal and oil plants have been made at the large cooperative reduction plant--Andelsolielefabriken--in Esbjerg since the lengthy report issued earlier this year by the Fish Odor Committee of the Academy for the Technical Sciences, according to an interview with the production manager reported in *Vestkysten*, an Esbjerg daily paper. During work with the experimental installation based on the report, it was found that the bad odors were bound to quite small particles which went out the smoke stack. The new development is the discovery that an oil bath can be added in the closed circuit after the water bath and filtering devices. The odor apparently can be bound completely in the ordinary Diesel oil used in the oil bath. The Diesel oil may be used later for the usual purposes as it is not affected by its use as a cleaning agent. When the Diesel oil is burned, the odor particles disappear completely.

A larger experimental installation is to be constructed by a new Danish company, "Chemical Research Organization" (CRO), which operates entirely on a research basis. The CRO has supplied a newly developed Danish instrument which is one of the first in the world which is able to indicate bad odors. The apparatus was developed by Lava Olsen, an engineer in the Technological Research Laboratory of the Danish Ministry of Fisheries. The apparatus is built on a spiral principle and has been invaluable in the odor-elimination research. (European Regional Fisheries Attache, United States Embassy, Copenhagen, September 24, 1962.)

FISHERY LANDINGS IN DANISH PORTS,
JANUARY-AUGUST 1962:

Landings of fish, crustacea, and mollusks in Danish ports in 1962 were 21 percent ahead of 1961 for the first eight months and seven percent ahead of 1959, the record year for landings. Catches in all the important categories have been as good as, or better

Landings of Fish, Crustacea, and Mollusks in Danish Ports, January-August 1962, 1961, and 1959				
Species	January-August			
	1962	1961	1/1959	
	(1,000 Metric Tons)			
Plaice, dabs, & flounders	37.9	37.3	28.6	
Cod	46.1	48.6	45.5	
Herring	199.5	174.5	199.2	
Breeding	5.9	5.6	3.6	
Crustacea ^{2/}	4.2	3.8	2.9	
Other ^{3/}	261.9	188.3	238.7	
Total	555.5	458.1	518.5	

1/Year of record total catch--667, 800 tons.

2/Mostly deep-water shrimp and Norway lobster.

3/Mostly sand eels or launce, sperling, whiting, and other fish for reduction to meal and oil, and for trout and animal food.

Denmark (Contd.):



Danish fisherman standing on a typical live box or float in which live plaice are held for marketing. In 1961 live plaice ex-vessel price was 10.8 cents a pound. Fish shops throughout Denmark carry live plaice.

than, in 1959. (European Regional Fisheries Attache, United States Embassy, Copenhagen, September 26, 1962.)



Fiji Islands

TUNA BASE APPROVED BY JAPANESE GOVERNMENT:

The Japanese Government, on September 3, 1962, approved the establishment of the South Pacific Ocean Fisheries Cooperative Association, which was organized for the purpose of managing the tuna base to be jointly established at Levuka, Fiji Islands, with British interests. The Association, which plans to operate thirty 99-ton medium tuna vessels during the first year of operation, reportedly is seeking a vessel tonnage allocation of 3,000 metric tons for the base and hopes to secure a minimum of 2,000 tons. The Japanese Government was expected to grant the tonnage allocation sometime in October this year. (Japanese periodicals *Hokkai Suisan*, September 3, *Nihon Suisan Shim-bun*, September 7, 1962.)

FISHERIES DIVISION TO BE ESTABLISHED:

The Fiji Department of Agriculture plans to establish a fisheries division. It will undertake the study of marine fishing techniques, the regulation and stocking of inland fisheries, the preparation and implementation of fisheries legislation, the study of fish marketing problems, and to a limited extent will carry out fisheries research. (*South Pacific Bulletin*, July 1962.)



Ghana

ECONOMIC COOPERATION WITH JAPAN:

A Ghanaian firm will charter six trawlers from a Japanese fishing company, according to newspaper reports in Ghana. The purpose of the vessel charter agreement was described as "the development of a deep-sea fishing industry in Ghana." The Ghanaian firm may purchase the vessels if fishing is profitable.

Ghana and Japan signed an economic and technical cooperation agreement on September 24, 1962, in Tokyo, Japan. As an initial undertaking, the Japanese Government is to establish a training center in Ghana and will provide teaching aids, materials, and machinery, as well as technicians and teaching staff. (Editor's note: Although details are lacking, it seems probable that Japanese technical assistance to Ghana will include aid to Ghana's fishing industry.) The agreement calls for the award of grants to enable Ghanaians to study in Japan. The Japanese Government will also send experts to encourage the economic and technical development of Ghana. It is understood that the cooperation agreement is for 5 years. (United States Embassy, Accra, October 9, 1962.)

SIX FISHING VESSELS TO BE PURCHASED FROM JAPAN:

According to an announcement in *The Ghanaian Times*, Ghana will purchase six fishing vessels from Japan. The announcement was made by Ghana's Minister of Agriculture, following consultations with a delegation of Japanese fishing experts. A two-man delegation was expected to leave for Tokyo to conclude the purchase on behalf of the Ghana Fishing Corporation, the Minister

Ghana (Contd.):

said. (United States Embassy, Accra, October 7, 1962.)

SOVIETS LAND FISH IN GHANA:

The landing at Tema of 500 metric tons of fish from the a Soviet fishing vessel was reported by the local press in September 1962. The consignment was accepted for a Ghana fishing corporation by the Minister of Agriculture, who announced that a second consignment of 2,500 tons was expected. The local representative of the Soviet Foreign Trade Corporation for Foodstuffs said that his organization would supply the Ghana firm with 2,000 tons of fish every month. A fleet of 25 Soviet vessels (including three with refrigeration facilities) were fishing off the west coast of Africa in September 1962, the Soviet official stated.

SOVIETS TO DELIVER FISHING VESSELS:

Three of the ten fishing vessels ordered by Ghana from the Soviet Union under a £G1,670,000 (US\$4.7 million) agreement signed on August 26, 1961, will be delivered in 1963. The first, cited as the Pioneer, a trawler of 900 tons deadweight, was launched at the Leninskaya Kuznitsa shipyards in Kiev and is expected to arrive in Ghana in June 1963. The vessel is stated to have a speed of 13 knots, a range of 37 days, and modern navigation and refrigeration equipment. The vessel will be manned by a Soviet crew who will train Ghanaian replacements. Ghana's Minister of Agriculture announced that 80 Ghanaians were expected to leave shortly for the Soviet Union to learn how to operate the new fishing craft, according to the local press. (United States Embassy, Accra, September 25, 1962.)

Note: See Commercial Fisheries Review, October 1962 p. 55.

GHANAIAN FISHERMEN TRAINED TO USE PURSE SEINES:

United States fishermen assisted by two British fishermen trained Ghanaian fishermen on the four new seiners purchased from a British shipyard. Fishing is being done in equatorial waters with seines 2,700 feet long and 276 feet deep. Catches ranging up to 135 tons per set have included tuna, sharks,

swordfish, rays, sea turtles, and barracuda. (Fishing News, British fishery periodical, August 24, 1962.)



Greece

OUTBOARD MOTORS DONATED TO GREEK FISHERMEN:

Ten United States manufactured outboard motors for use in fishing vessels were donated by CARE to Greek fishing cooperatives in two small villages in northern Greece. The motors were distributed among needy fishermen who formerly were able to fish only a short distance away from shore. With engines in their fishing craft, they will now be able to fish up to about three miles offshore.

Representatives of CARE and the United States manufacturer of the outboard motors delivered the equipment to the cooperatives which were selected by the Greek Agricultural Bank and the Director of Fisheries of Greece's Ministry of Industry. (Alieia, Athens, Greece, August 1962.)



Iceland

FISHERIES TRENDS, LATE SEPTEMBER 1962:

Trade with Communist Bloc Countries: Communist Bloc countries have engaged in barter trade with Iceland and then sold Icelandic barter trade exports to Western European countries for hard currency. The disclosure appeared in the Icelandic independent newspaper, Morgunbladið, of September 22, 1962. Specific examples cited included the sale by Hungary of Icelandic frozen fish in Austria. The newspaper article was part of a series pointing out the disadvantages of barter trade with Communist Bloc countries.

Iceland plans to import a dozen 20-ton motor fishing vessels from the U.S.S.R. The first of the vessels arrived in Iceland on board an Icelandic merchant ship. The vessels will be fitted out with motors of British manufacture. Iceland has obtained fishing vessels from East Germany, but this is the first import of Soviet-made vessels. The Soviet vessels will be subject to clearance for seaworthiness by the Director of the State Ship Inspection Service.

Iceland (Contd.):

Thorlakshofn Harbor Project: The economic importance of developing a harbor at Thorlakshofn on Iceland's south coast has been stressed by leaders inside and outside the Government. But all sorts of delays have plagued the start of such a project. After bitter controversy over which firms should receive the Thorlakshofn harbor contract, the Lighthouses and Harbors Administration early this year made the award jointly to an Icelandic and Danish building firm. Although work was supposed to begin last spring, only preparatory measures had been taken so far. The Central Bank is still negotiating financing with certain New York City banks for all or part of the cost of the \$1,050,000 project. Reportedly the financing will be for 10 years at 6½ percent interest. However, on September 4, 1962, the Central Bank loaned the Harbors Administration 8.6 million kroner (US\$199,700) as a first installment on the project.

Whaling: A total of 483 whales were taken during this year's whaling season by Icelandic whalers, as compared with the catch of 350 whales in 1961. This year's whale catch was surpassed only by the catch of 517 whales in 1957 and 508 whales in 1958. Whalers benefited from good weather this summer. Two whale catcher vessels were bought in Norway this year to replace part of Iceland's fleet of 4 whalers. (United States Embassy, Reykjavik, September 28, 1962.)



Japan

PRICE DROP IN AUGUST 1962 FOR FROZEN TUNA EXPORTS TO U. S.:

The f.o.b. Japan price for frozen tuna exported to the United States started to drop the latter part of July 1962. The Japanese ex-vessel tuna prices also dropped. At about mid-August, the ex-vessel price at Yaizu for yellowfin (20-100 pounds) dropped to US\$271 a metric ton. This was the lowest price in 1962. Compared with the highest price in the recent past, it was nearly \$75 a ton lower.

The following reasons were given for the decline: (a) ship-frozen tuna had increased since the beginning of August; (b) exporters

were selling only fish which they were sure of getting and not as in the past when they were selling futures without adequate stocks; (c) there were no sales negotiations in progress.

When the ex-vessel price dropped to \$276 a ton, Japanese canners began buying. As of mid-August 1962, the ex-vessel price for albacore tuna was still \$376 a ton for good-quality fish. (Suisan Tsushin, August 27, 1962.)

STATUS OF FROZEN YELLOWFIN TUNA EXPORT QUOTA:

As of July 31, 1962, Japanese production of frozen yellowfin tuna for export to the United States was being carried out faster than last year and exceeded 25,000 short tons. The total production quota this year is 35,000 tons. While there were some firms that had used up their entire quota as of the end of July, others still had 90 percent of their quota left unused, according to figures compiled by the Export Frozen Tuna Fisheries Association.

Under the circumstances, considerable opposition is raised against an increase in the quota at this time. Also, the recent slackening of exports to the United States is causing concern whether or not the remaining 10,000 tons will be used. The Association is inclined to postpone consideration of an increase in the quota for the time being.

But it is believed by some that the year's quota of 35,000 tons for frozen yellowfin tuna is inadequate and sooner or later it must be increased. The Association is of the opinion that it probably will be increased in October 1962. (Suisan Keizai Shimibun, September 14, 1962.)

FROZEN TUNA EXPORTS TO U. S. DIRECT FROM JAPAN, APRIL-SEPTEMBER 1962:

According to Export Frozen Tuna Manufacturers Association, exports of frozen tuna from Japanese ports to the United States

Frozen Tuna Exports to U. S. Direct from Japan, April-September 1962		
Species	1962	1961
	... (Short Tons) ...	
Albacore	10,227	9,138
Yellowfin	27,258	18,424

Japan (Contd.):

from April through September 1962 were substantially higher than during the same period a year earlier.

The exports were reported to have slowed down sharply since mid-August this year.

Note: The Japanese fiscal year begins April 1.

FROZEN TUNA EXPORTS TO ITALY:

Japanese exports of frozen tuna to Italy reportedly increased since Italy enlarged her frozen tuna import quota from 25,000 metric tons to 40,000 metric tons. Of Italy's total imports of 25,000 metric tons of frozen tuna as of early October 1962, imports from Japan totaled 19,000 metric tons (17,500 tons of Atlantic-caught tuna and 1,500 tons delivered from Japan proper). Price paid by Italy was reported at \$370 per metric ton, c.i.f., which is \$90 higher than the price offered during the same period in 1961.

The Japan Export Frozen Tuna Producers Association foresees a further increase in tuna exports to Italy. Direct exports from Japan proper are also increasing, due to the recent decline in frozen tuna demand in the United States and the lower freight rate now charged by non-scheduled freighters for shipments to Italy. (*Nihon Suisan Shimbun*, October 12, 1962.)

EXPORTS OF FROZEN TUNA TO THE UNITED STATES, 1961:

Species	1961		1960	
	Quantity Metric Tons	Value US\$ 1,000	Quantity Metric Tons	Value US\$ 1,000
Albacore	10,357	3,151.3	8,923	2,463.0
Yellowfin	18,633	4,213.3	21,193	4,890.0
Other	2,464	484.8	-	-
Total	31,454	7,849.4	30,116	7,353.0

Type of Products	Albacore		Yellowfin		Big-Eyed		Bluefin		Skipjack		Total all Species	
	Quantity Metric Tons	Value US\$ 1,000	Quantity Metric Tons	Value US\$ 1,000	Quantity Metric Tons	Value US\$ 1,000	Quantity Metric Tons	Value US\$ 1,000	Quantity Metric Tons	Value US\$ 1,000	Quantity Metric Tons	Value US\$ 1,000
Whole Fish	22,250	7,443.3	-	-	200	45.4	-	-	555	121.4	23,005	7,610.1
Processed Fish:												
Fillet	1	0.7	3,289	1,180.5	409	155.1	30	8.0	-	-	3,729	1,344.3
Gilled and gutted	-	-	24,799	6,897.1	-	-	-	-	-	-	24,799	6,897.1
Loins	1,398	1,057.1	2,606	1,663.5	25	48.3	6	3.8	1	0.6	4,096	2,773.3
Other	10	4.2	551	93.8	24	5.4	-	-	-	-	585	103.4
Total	23,659	8,505.3	31,245	9,834.9	718	254.2	36	11.8	556	122.0	56,214	18,728.2

Japanese licensed exports of frozen tuna products to the United States direct from Japanese ports amounted to 56,214 metric tons and included whole fish, gilled and gutted fish, fillets, loins, and other products.

EXPORTS OF FROZEN TUNA AND CANNED TUNA IN BRINE, FY 1961:

Shipments to the United States accounted for 66.0 percent of the quantity and 69.4 percent of the value of Japanese frozen tuna approved for export in fiscal year 1961 (April 1961-March 1962), according to data released by the Japanese Fisheries Agency.

Item	Quantity	Value
	Metric Tons	US\$1,000
Tuna, Frozen:		
Total Japanese exports	132,900	38,306
Exports to the United States	87,700	26,578
	1,000 Cases	US\$1,000
Tuna, Canned in Brine:		
Total Japanese exports	3,701	29,734
Exports to the United States	2,205	19,179

Shipments to the United States accounted for 59.6 percent of the quantity and 64.5 percent of the value of Japanese canned tuna in brine approved for export in fiscal year 1961. (*Minato Shimbun*, October 9, 1962.)

ELEVENTH SALE OF CANNED TUNA IN BRINE FOR EXPORT TO U. S.:

The Tokyo Canned Tuna Sales Company, representing Japanese canners, announced in mid-October 1962 that 130,000 cases of canned tuna in brine (consisting of 75,000 cases of white meat tuna and 55,000 cases of light meat tuna) for export to the United States were to be offered to exporters at the eleventh canned tuna sale. Japanese exports of canned tuna in brine to the United States up to and including the eleventh sale total 2,202,960 cases, thus completely using up the quota of 2,200,000 cases established for this

Japan (Contd.):

year by the Japan Canned Foods Exporters Association for export to the United States.

Some segments of the Japanese tuna canning industry believe that the total quantity of tuna packed in brine that will enter into the United States will fall short of the 1962 United States import quota under the 12½-percent rate of duty by 100,000 to 200,000 cases. United States imports of canned tuna in brine from other countries dropped in 1962. However, in view of the softening of the canned tuna market in the United States, the Japanese Canned Foods Exporters Association is reported to be reluctant to increase the export quota until it has made a careful study of sales of canned tuna in brine on hand and the marketing conditions prevailing in the United States. (Suisan Tsushin, October 16, 1962.)

EXPORTS OF CANNED TUNA IN OIL, APRIL-JULY 1962:

A total of 298,902 cases of canned tuna in oil were approved for export during April-July 1962, according to data compiled by the Japan Export Canned Tuna Producers Association. This amounts to only 57 percent of the canned tuna in oil exported during the

same period last year when 521,205 cases were sold.

Exports of canned tuna in oil for April-July 1962 by species are shown in table. Exports of yellowfin and big-eyed tuna this year are down substantially. (Suisan Tsushin, October 8, 1962.)

Note: Japanese year begins on April 1.

EXPORTS OF CANNED TUNA IN OIL, APRIL-AUGUST 1962:

Data compiled by the Japan Export Canned Tuna Producers Association reveals that canned tuna in oil approved for export during April-August 1962 totaled 433,272 cases, about 70 percent of the 618,585 cases exported during the same period in 1961. (Suisan Tsushin, October 12, 1962.)

Japanese Exports of Canned Tuna in Oil with Comparisons		
Principal Countries of Destination	April-August	
	1962	1961
(Cases).....	
West Germany	136,069	193,292
Canada	93,189	125,215
Netherlands	38,413	53,750
Belgium	34,982	26,339
England	24,950	32,854
Switzerland	17,785	30,114
Syria	15,889	13,678
Lebanon	13,356	28,531

EXPORTS OF CANNED FISHERY PRODUCTS, JANUARY-MARCH 1962:

Total Japanese exports of canned fishery products in January-March 1962 were 50.4 percent higher than in the same period of 1961. The increase was general among most of the important products with salmon and mackerel-pike showing the largest increase.

Japanese Exports of Canned Tuna in Oil, April-July 1962		
Species	1962	1961
	(Number of Actual Cases)	
Albacore	76,708	128,934
Yellowfin	4,751	80,777
Big-eyed	98,117	208,424
Skipjack	74,292	34,541
Tuna flakes	45,034	68,529
Total	298,902	521,205

Japanese Canned Fishery Products Exports, January-March 1962 and 1961					
Product	January-March 1962			Jan.-March 1961	
	U. S.	Canada	Other Countries	Total	Total
(Cases/1).....				
Crab meat	35,889	1,425	55,731	93,045	78,419
Tuna:					
In oil	-	41,145	259,109	300,254	285,400
In brine	600,700	-	-	600,700	525,600
Other types	100	25	73,477	73,602	28,423
Total tuna	600,800	41,170	369,586	974,556	839,423
Mackerel-pike	13,185	200	269,974	283,359	91,743
Sardine	7,478	-	27,646	35,124	29,166
Horse-mackerel	-	-	101,825	101,825	112,728
Salmon, trout	51,031	5	626,984	678,020	219,509
Other fish	8,034	2,488	86,024	96,546	87,879
Shellfish	58,819	31,586	17,338	117,743	128,826
Other aquatic products	4,475	80	4,381	8,936	1,253
Grand total	789,711	76,954	1,522,489	2,389,154	1,588,976

1/Tuna exports reported in standard cases (48 7-oz. cans); other products reported in actual cases.

Japan (Contd.):

**CANNED TUNA IN OIL MARKET
IN EUROPE WEAKENS:**

Some weakening of the European market for Japanese tuna canned in oil was reported in mid-September 1962. The highest prices obtainable by the Japanese packers for shipments to Europe in September were US\$6.39-6.53 a case. This was a decrease of almost 28¢ a case. As previously reported, skip-jack tuna fishing off the Sanriku coast of Japan again became active early in September and the tuna packers were stepping up the packing of "in oil." (Japanese periodical Suisan Tsushin, September 17, 1962.)

**TUNA VESSEL OPERATIONS IN
ATLANTIC OCEAN, OCTOBER 1962:**

There were 77 Japanese tuna long-liners operating in the Atlantic Ocean as of mid-October 1962--30 vessels more than fished in the Atlantic Ocean during the same period in 1961. Japanese tuna vessels fishing in the Atlantic during January to October 1962 averaged 68 vessels per month as compared with the monthly average of 58 vessels in 1961, 48 vessels in 1960, and 33 vessels in 1959.

Most of the Japanese tuna vessels in the Atlantic Ocean were concentrated in the South Atlantic off the West African coast, where they were primarily fishing for albacore tuna. Unlike the light yellowfin tuna fishing this year in the Atlantic Ocean, albacore fishing was reported to be relatively good. The 500-ton tuna vessels caught an average of eight metric tons of albacore per day.

Because export prices of Atlantic-caught tuna for the United States were down (ranging from \$300 to \$310 a short ton, delivery Dakar), exports of Atlantic-caught tuna to the United States fell-off. Exports to France however, were maintained at a price of around \$430 a metric ton, delivery at French ports of destination. (Suisan Tsushin, October 17, 1962.)

**RESEARCH VESSEL TO SURVEY
EASTERN PACIFIC OCEAN
TUNA RESOURCES:**

In order to investigate tuna resources, the Japanese Fisheries Agency's research

vessel Shoyo Maru (602 gross tons) was scheduled to depart Tokyo on November 1, 1962, on an exploratory cruise to the eastern Pacific Ocean. The waters to be surveyed are located within the yellowfin tuna fishery regulatory area recommended by the Inter-American Tropical Tuna Commission and are bound by the lines intersecting at the following points: 10° N. latitude and 110° W. longitude; 12° S. latitude and 95° W. longitude; 12° S. latitude and 125° W. longitude; 40° S. latitude and 95° W. longitude; 40° S. latitude and 85° W. longitude; 20° S. latitude and 107° W. longitude; 20° S. latitude and 80° W. longitude; 10° N. latitude and 100° W. longitude.

Research objectives are: (1) study geographical distribution and abundance of important fish; (2) study catch composition, catch quantity, and hook rate by fishing area; (3) conduct observations on water depth, water temperature, and current, and relate their effect on catch; (4) study the following fishery conditions at ports of call: (a) economic aspects of port, (b) natural conditions, (c) fishery facilities, (d) local fishing conditions, (e) economic condition of fishing industry, (f) fishery production conditions, (g) marketing and consumption of fishery products.

The Shoyo Maru is scheduled to call at Honolulu (November 16), San Diego (November 29), Callao, Peru (December 31), Valparaiso, Chile (February 8, 1963), and Papeete, Tahiti (March 2, 1963). Date of return to Tokyo is scheduled for March 31, 1963. (Minato Shimbun, October 19; Suisan Keizai Shimbun, October 12, 1962.)

TUNA EX-VESSEL PRICES AT TOKYO:

The following ex-vessel prices were reportedly paid on October 18, 1962, for 160 metric tons of tuna and tuna-like fish landed in Tokyo by the Sakura Maru No. 8. (Suisan Keizai Shimbun, October 23, 1962.)

Tokyo Ex-Vessel Tuna Prices, October 18, 1962		
Product	Price	
	Yen/Kg.	US\$ Short Ton
Yellowfin (Gilled & Gutted):		
Special large (over 120 lbs.) . .	95	239
Large (100-120 lbs.)	102	257
Small (20-80 lbs.)	107	270
Albacore (gilled & gutted)	133	335
Fillets:		
Yellowfin	122	308
Big-eyed	132.6-134	334-338

Japan (Contd.):

NEW REGULATIONS FOR PORTABLE-VESSEL-CARRYING TUNA MOTHERSHIPS:

The Japanese Fisheries Agency announced, on September 12, 1962, new regulations governing the operation of portable-vessel-carrying tuna motherships, effective September 11. Under the new regulations, existing portable-vessel-carrying motherships, all of which are vessels of less than 2,000 gross tons, will be classified as Class I portable-vessel-carrying motherships and those of 2,000 gross tons or more will be classified as Class II portable-vessel-carrying motherships. Class II motherships differ from Class I motherships in that the motherships in that category will not be permitted to engage directly in fishing. Reportedly, the new category was established primarily to provide a more rational vessel tonnage replacement system for that type of fishery, and thereby improve its management.

At the present, there are a total of 24 large tuna vessels, ranging in size from 471 tons to 1,913 tons gross, of which 17 are over 1,000 tons, registered as Class I portable-vessel-carrying tuna motherships. The number of portable vessels (under 20 tons gross) carried by those motherships range from 1 to 6 each, or a total of 67.

Following the Fisheries Agency's announcement, a large fishing company was reported to be planning on dispatching the Banshu Maru No. 5 (3,700 gross tons) to the Indian Ocean fishing grounds as a Class II mothership, carrying eight portable catcher vessels. The vessel was scheduled to depart Tokyo on September 22 for the fishing grounds off Madagascar in the Indian Ocean, where fishing of albacore and yellowfin tuna was reported to be good. The catch target is 2,400 metric tons of tuna.

Concerning the Class II portable-vessel-carrying motherships, the company in charge of fishing vessel operations commented as follows: "This type of mothership operation, in which only 20-ton portable vessels are employed in actual fishing, becomes difficult when a storm occurs at sea. However, the 20-ton portable vessel can achieve the same catch efficiency as that of a 100-ton tuna vessel, so this type of fishing operation greatly improves management efficiency of mothership-type fleet operation. Moreover, there is the advantage of mobility."

At least three more large Japanese companies are planning to operate Class II motherships in the Indian Ocean. The motherships to be used are: the Keiyo Maru (3,500 gross tons); the Ishiyama Maru (3,300 gross tons); and the Kazushima Maru (3,800 gross tons). Each of those motherships will carry at least eight portable catcher vessels. (Japanese periodicals Suisan Keizai Shimbun, September 13, 1962; Suisan Tsushin, September 14, 1962.)

FOUR JAPANESE FIRMS TO USE CLASS TWO TUNA MOTHERSHIPS WITH PORTABLE VESSELS:

A large Japanese firm sent the No. 5 Banshu Maru (3,700 tons) mothership, with eight 20-ton fishing vessels on board, to the Indian Ocean east of Madagascar. The vessel was to have left Tokyo on September 22, 1962, as the first mothership licensed as a Class 2 portable-fishing-vessel type operator.

The eight catchers would catch an average of 25 metric tons a day, mainly yellowfin and albacore tuna. A total catch of 2,400

tons is expected to be caught by the end of February 1963. Besides the one firm, three others were said to be planning to send similar mothership expeditions to the same fishing ground on much the same scale as the No. 5 Banshu Maru.

Pelagic tuna vessels, which previous to the change in regulations were considered motherships with portable fishing vessels, are now classified Class 1. There are 24 such motherships with a total of 67 portable fishing vessels. The total gross tonnage of the "motherships" is 28,216 tons. (Suisan Tsushin, Japanese periodical, September 14, 1962.)

The existing tuna motherships with portable vessels classified Class 1 should be smaller than 2,000 gross tons in size. The new Class 2 motherships should be larger than 2,000 gross tons in size and the mothership itself cannot fish in contrast to Class 1 motherships which can fish.

TUNA MOTHERSHIP OPERATION IN INDIAN OCEAN:

A large Japanese fishing company's Class II portable-vessel-carrying tuna mothership Banshu Maru No. 5 (3,700 gross tons), which departed Tokyo on September 22, 1962, for the fishing grounds in the Indian Ocean, was reported to have started fishing on October 16 in the vicinity of 8°14' S. latitude and 53°33' E. longitude. During the first two days, the eight catcher vessels carried by the mothership landed a total of 25 metric tons of fish, which is somewhat below the planned daily catch of 16 metric tons. Composition of the catch was about as follows: yellowfin 60 percent; big-eyed 25 percent; spearfish 9 percent; other species 6 percent. The albacore tuna catch was extremely light. Other fishing vessels operating in that area also reported poor fishing the latter part of October.

The Banshu Maru No. 5 is the first Class II portable-vessel-carrying tuna mothership to be dispatched to the fishing grounds since the revised tuna mothership regulations were put into effect on September 11. Under the revised regulations, Class II tuna motherships (over 2,000 gross tons) are not permitted to engage directly in fishing and must use portable vessels for the actual fishing. (Suisan Tsushin, October 22, 1962.)

Japan (Contd.):

**YAIZU FISHERY LANDINGS,
JANUARY-AUGUST 1962:**

A total of US\$25.6 million worth of fishery products was landed at Yaizu (leading Japanese tuna port) during January-August 1962. The landings this year have been higher in quantity, but lower in value. The total landings in 1961 were worth \$27.8 million. The quantity landed this year through August amounted to 96,214 metric tons, 5 percent more than in the same period of 1961.

Yaizu Fishery Landings, August 1962		
Species	Quantity	Value
	Metric Tons	US\$
Tuna (excl. albacore & skipjack) . . .	4,565	1,000
Albacore	510	1,339
Skipjack	2,650	568
Mackerel	46	8
Others	529	106
Total	8,300	2,215
January-August 1962	96,214	25,654
" " 1961	91,622	23,544

Landings in August 1962 totaled 8,300 tons, worth \$2,215,330. (*Suisan Keizai Shim-bun*, Sept. 19, 1962.)

**FROZEN TUNA HEADS
EXPORTED FOR BAIT:**

A Japanese fishery plant in Kesennuma exported 20 metric tons of frozen skipjack tuna heads to Australia. They are to be used as bait in crab and spiny lobster fishing on the coasts of Australia. The offer to buy the heads was made to the Japanese plant last year.

On the Australian coasts, cuttlefish in a basket is now being used for bait to attract spiny lobster and crab. When the shellfish are gathered around that bait, another type of bait is used to hook them. The supply of cuttlefish, however, is not only insufficient but also high-priced, and it was decided to use the heads of skipjack that are now discarded. Good results have been obtained by Australian fishermen using the heads of Alaska pollock from Hokkaido. If the use of skipjack heads proves satisfactory, a large export trade in that product is expected. (*Suisan Keizai Shim-bun*, Japanese periodical, September 19, 1962.)

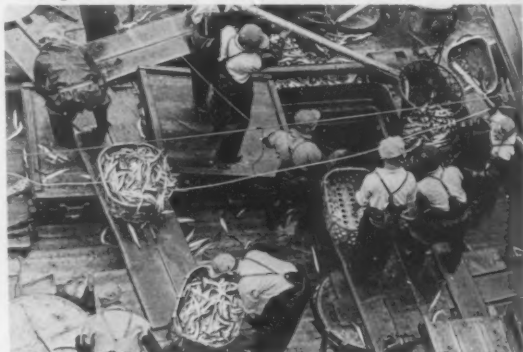
**FROZEN HALIBUT EXPORT
TRENDS, AUGUST 1962:**

Japanese exports of frozen halibut towards the end of August 1962 were reported continuing satisfactorily. Early in August inquiries became more active and the market was firmer, according to the Japanese periodical *Suisan Tsushin* of August 29, 1962. At the end of August the price c. & f. delivered on the east coast of the United States was 8-10 cents higher than in the same period last year.

By July this year, some 600 short tons of frozen halibut (believed to be mostly steaks) were estimated to have been shipped. The quantity contracted for export was said to be in excess of 1,000 tons. It is felt that this year's exports will exceed last year's 1,150 tons--990 tons to the United States and 160 tons to other countries.

**CANNED JACK MACKEREL SALES,
APRIL-SEPTEMBER 1962:**

According to data compiled by the Japan Canned Sardine and Saury Sales Company, export canned jack mackerel consigned to the Sales Company during the period of April 1 to September 15, 1962, totaled 439,500 cases,



Washing and packing mackerel aboard a Japanese fishing vessel.

Japanese Exports of Canned Jack Mackerel by Principal Destinations, April 1-September 15, 1962	
Country or Area of Destination	No. of Cases
Near and Middle East	13,360
West Africa	31,211
Ceylon	31,554
Indonesia	22,100
Singapore (Malaya)	69,120
Borneo	15,930
New Guinea	17,257

Note: The Japanese year begins on April 1.

Japan (Contd.):

of which 215,000 cases were contracted for sales. Consignments and sales of export canned jack mackerel have shown a decline compared with the corresponding period last year.

Export sales to countries contracting for more than 10,000 cases each during April 1 to September 15, 1962, are shown in table. (Minato Shimbun, October 2, 1962.)

UNITED STATES-JAPAN AGREE ON SANITATION STANDARDS FOR FRESH OR FROZEN OYSTERS:

The United States and Japan on October 23, 1962, signed an agreement directed toward improving sanitation standards and practices in production and handling of fresh or frozen oysters, clams, and mussels intended for shipment between the two countries. The Agreement provides for establishment of mutually acceptable sanitation standards, exchange of information on the state of compliance with sanitation standards by industries of the respective countries, and a system of certification for fresh or frozen oysters, clams, and mussels shipped from Japan to the United States.

The Agreement is similar to the United States-Canada shellfish sanitation agreement signed in 1948. Practically all oysters, clams, and mussels sold in the United States and Canada are produced under arrangements whereby each is assured that the other is carrying out sanitary surveys of growing areas and preventing harvesting from condemned waters.

Signing the Agreement on behalf of the United States was the Assistant Secretary of State for Far Eastern Affairs, and for Japan was the Ambassador of Japan to the United States. Subsequent implementing arrangements were signed by the Surgeon General of the U. S. Public Health Service and the Counselor of the Embassy of Japan.

STERN TRAWLER DEPARTS FOR WEST AFRICAN WATERS:

The Japanese stern trawler Akebono Maru No. 53 (1,450 gross tons) departed Shimono-seki, Japan, on September 27, 1962, for the trawl fishing grounds off the western coast

of Africa. The trawler is scheduled to conduct operations for a period of one year and two months.

The vessel, which will be based at Las Palmas, Canary Islands, has a catch target of 3,600 metric tons of sea bream, squid, and other fish. The catches will be transported back to Japan by 1,500-ton freezerships which will be dispatched to the Atlantic fishing grounds from Japan.

A stern trawler, Akebono Maru No. 50 (1,430 gross tons), belonging to the same company that owns the Akebono Maru No. 53, is currently operating in the West African waters. (Nihon Suisan Shimbun, October 3, 1962.)



Republic of Korea

KOREAN GROUP VISITS ITALY TO IMPLEMENT LOAN TO BUILD FISHING VESSELS:

At the end of September 1962, a group of Koreans departed for Italy and France to negotiate arrangements for implementing the contract for a loan of approximately US\$120 million for Korea's fishing industry.

There has been no progress report on the negotiations for implementation of the contract (with an Italian-French combine) which was signed on August 8 and which provided for a substantial increase in Korea's fishing fleet. New fishing vessels with a total tonnage of 118,000 tons are to be built with the loan. (United States Embassy, Seoul, October 5, 1962.)



Lebanon

FISHERIES TRENDS.

A survey of Lebanon's fishing industry was completed in August 1962. The survey concludes that Lebanon's meager annual fishery catch could be increased tenfold. There are at present 3,255 fishermen on 970 fishing vessels catching annually only 2,320 tons of fish. Current consumption is low, and over 42 percent of it is met by imports.

A group of Japanese experts last year said that deep-sea and bottom fishing was the answer to Lebanon's small catch. The

Lebanon (Contd.):



lack of a major river emptying into the Mediterranean and the subsequent lack of plankton in coastal waters probably account for the small stocks off Lebanon's coast. The fishery stocks have been further depleted by the widespread practice of dynamiting for fish. In addition to increasing production of this cheap source of protein, the planners are faced with another problem, changing Lebanese consumption habits. (United States Embassy, Beirut, August 17, 1962.)



Malaya

JOINT JAPANESE-MALAYAN CANNERY REPORTED PACKING TUNA IN BRINE:

According to information received by Japanese trading firms, the Malayan Marine Industries, a tuna cannery managed by the Japanese Overseas Fishing Company, appeared to have finally begun packing canned tuna in brine for export to the United States. In December 1961, the Malayan cannery was authorized to annually export 36,000 cases of canned tuna to the United States, but due

to the unprofitable operation of the venture, tuna packing had been suspended.

Considerable attention is focused on the method of sale of the canned tuna packed by the Malayan plant. In particular, interest is focused on the following points: (1) What firm will handle the sales of Malayan canned tuna? (2) Will the export price be the same as that established for Japanese canned tuna exports? (3) How will quality compare with the Japanese product?

If any of the 18 Japanese export agencies that are currently handling exports of Japanese canned tuna undertake the sale of Malayan-packed tuna, the Japanese packers may raise an objection. Any other firm that handles exports of the Malayan production will be closely watched by the Japanese packers as to fairness of export price. (Suisan Tanshin, November 6, 1962.)



Mexico

SHRIMP FISHERY TRENDS, AUGUST-SEPTEMBER 1962:

West Coast Price Dispute Settled: Although Mexican west coast shrimp vessels were fishing toward the latter part of September, boat owners and cooperatives did not agree on final contract terms until September 29. Some 200 vessels had been tied up for more than a week because of a price dispute, but they started fishing on the basis of a tentative agreement reached on September 22. The 1961/62 west coast shrimp fishing season was originally scheduled to start on September 15, 1962.

The contract negotiations were finally concluded on October 1, 1962, and included a concept that is entirely new in Mexico's west coast shrimp fishery. The new contracts between boat owners and cooperatives now provide that the cooperative fishermen are to get 45 percent of the sales value of the shrimp they catch. Ever since the start of Mexico's shrimp fishery as a joint enterprise between boat owners and cooperatives, contracts (like those in effect at Mexico's Gulf ports) were based around a fixed price per ton of shrimp.

Shrimp fishing in Mexico has been reserved for the cooperative fishermen since 1940. Most of the shrimp vessels are privately owned, but are operated by cooperative fishermen on a contract basis approved by the Government. Recent reports were that some of the West Coast vessel owners were considering selling their vessels to the cooperatives.

The new contracts between boat owners and cooperatives on Mexico's west coast are for 3 years and remain in force until August 31, 1965. The principal terms of the contracts are:

1. In delivery of the shrimp, cooperatives are to receive 45 percent of the advance sales price of which only 45 percent of the freezing and packing expenses can be deducted. Shrimp freezing and packing expenses for the entire west coast of Mexico are fixed at 2 pesos a kilogram (7.3 cents a pound). It is customary for consignees to ad-

Mexico (Contd.):

vance the consignors 70 percent of the current shrimp market price at time of shipment. The current market price is determined from Market News Service "Fishery Products Reports" issued by the U. S. Bureau of Commercial Fisheries at San Pedro, Calif. The arrangements are presumed to be only for raw headless shrimp and do not cover processed shrimp such as peeled and deveined.

2. When final sales of shrimp are made, the cooperatives are to receive 45 percent of the difference between the advance price and final price. Also 45 percent of the sales costs will be charged to the cooperatives. Principal sales costs are: (a) brokerage fee, which by these contracts is limited to 7.5 percent; (b) freight; (c) export duty.

3. In addition to paying 45 percent of the freezing, packing and sales costs, the cooperatives are to pay for: (a) crew's food; (b) severance tax; (c) crew's salary and share; (d) crew's social security.

4. The boat owner is to pay for 55 percent of freezing, packing, and sales costs.

5. In addition, the boat owner is to pay all operating and maintenance costs of the vessels. These include all other costs not shown under "3."

6. The boat owner has the right to pack and sell the product wherever he chooses.

7. Marketable fish caught while fishing for shrimp are to be divided equally between the cooperative and the boat owner.

8. A portion (the amount to be determined by Mexico's Secretariat of Industry and Commerce) of the money the cooperatives receive from the sales of shrimp is to be deposited in the National Bank for Cooperative Development. This fund is to be used for the maintenance and acquisition of cooperative boats and plants.

East Coast Shrimp Contracts: Contract agreements covering Mexico's shrimp fishery at Gulf of Mexico ports were concluded earlier in September. They remain in force for two years until August 31, 1964, and contain the same terms as previous contracts. The Carmen contract calls for an increase to the fishermen of 30 centavos a kilo (about 1.1 U.S. cents a pound) for large headless shrimp. No increase was granted for small shrimp. The breaking point between large and small headless shrimp is between 30 and 31 count to the pound. In addition, the boat owners agreed to an increase of 1 peso (8 cents) per-man-per-day for food (which brings the daily per-man rate to 72 cents), and to pay 300 pesos (\$24) per-boat-per-month for medical services.

Fishing vessel crew shares on shrimp catches in Mexico's east coast fishery are shown in the following table.

Table 1 - Fishing Vessel Crew Shares at Mexican Gulf Ports

Crew Member	Large Shrimp (less than 30/31 count heads-off)	Small Shrimp (over 30/31 count heads-off)
	(U.S. ¢/lb.)	
Captain . . .	3.34	1.31
Engineer . .	2.62	1.13
Winchman . .	1.74	.87
Cook	1.74	.80

In addition, it is customary for boat owners to pay bonuses to the crew. These may at times be more than double those shown in the cents per pound crew shares for selected crew members. The Campeche shrimp contracts are only slightly different from those covering Ciudad del Carmen.

Shrimp Export Duties Increased: Mexico's shrimp export duties were increased about 38 percent during the latter part of August 1962 (published in *Diario Oficial*, August 27, 1962). Frozen shrimp exported from east coast points, and from Salina Cruz, Oaxaca, and Santa Rosalia, Baja California, now has a Federal export tax of about 3.5 cents a pound. The export duty on frozen shrimp from the rest of Mexico's west coast is about 3.7 cents a pound. In the State of Campeche, there is an additional local tax of about 2.2 cents a pound on shrimp exports.

Cooperative Buys Shrimp Freezing Plant: The first shrimp freezing plant in Mexico to be owned by cooperative fishermen was purchased by the Regional Federation of Cooperative Societies "Southern Sonora" during August. The plant, which is located in Guaymas and was formerly the "Mariscos Congelados del Pacifico," was bought with funds from a loan of about \$136,000 from Mexico's National Bank for Cooperative Development.

Fishing Port being Developed with Dutch Funds: A fishing port at Alvarado, Veracruz, is to be developed with funds from a loan of about \$6 million granted by Dutch interests in Amsterdam to the National Bank for Cooperative Development. The total cost of developing the fishing port is estimated at a little more than \$6 million, with completion date for the project set at two years. The project will include port and harbor works, 5 multipurpose fishing vessels, freezing, canning, smoking and drying facilities, and also ice-making and fishmeal plants. (United States Embassy, Mexico City, dispatch dated October 5, 1962.)



Morocco

TERRITORIAL WATERS EXTENDED:

Morocco has declared a 12-mile limit on her territorial waters in the Mediterranean Sea and the Atlantic Ocean, and a 6-mile limit on the waters off the coast of southern Morocco, according to information received by the Japanese Fisheries Agency.

Reportedly, this measure was taken to protect Morocco's domestic fishing industry. The 12-mile limit will affect Japanese trawl fishing in West African waters, particularly off the north-western coast of Africa, where 12 to 13 large Japanese trawlers are regularly trawl fishing. (*Suisan Keizai Shimbun*, October 16, 1962.)

FROZEN SARDINE EXPORTS TO FRANCE TO BE RESUMED:

Moroccan frozen sardine exports to France were expected to be resumed in October 1962. It was anticipated that the supply from French sources would be insufficient to meet the demand. Exports of frozen sardines to France were suspended in July 1962.

A total of 2,000 metric tons of frozen tuna were to be exported to France also.

Morocco (Contd.):

The Moroccan fishing and freezing industries are heavily dependent upon exports of frozen fish to France. The loss of that market has been a hard blow to them. (Based on a newspaper article as reported by the United States Embassy, Rabat, October 8, 1962.)



Mozambique

SEEKS JOINT FISHING VENTURE WITH JAPAN:

The Japan Export Trade Promotion Association and the Japan Fisheries Society reportedly have received an inquiry from fishing interests in Mozambique, Africa (Portuguese possession) which are said to be seeking a joint Japanese-Portuguese fishing venture in Beira, Mozambique. Mozambique does not have a large fishery, although her extensive eastern coast abounds in high quality fish, especially shrimp. Bottomfish fishing is prohibited in Mozambique, but the territorial government is said to have recently approved seining and trawling.

In Beira, three small fishing vessels were engaged in fishing as of November 1962, but fishing on such a small scale cannot possibly meet market demands. Therefore, by linking up with the Japanese, the fishing interests in Beira hope to introduce Japanese investments and fishing techniques to increase Mozambique's fish production. A large potential consumer market for fish exists in Rhodesia where good transportation facilities are available. The Mozambique Government is also reported to have approved the establishment of a joint venture with Japanese investments. (Suisan Tsushin, November 7, 1962.)



Nigeria

POLAND SENDS FACTORY TRAWLER TO NIGERIA:

The Neptun, a Polish vessel of the 280-foot Dalmor-class factory stern trawler, in August 1962 departed on a 10-months' trip to West African waters to fish for a joint Nigerian-Polish company at Lagos. The firm will service the vessel and additional Polish trawlers which will be delivering

catches to Nigeria. (Polish Press Digest, September 2, 1962.)



Norway

TUNA LANDINGS AS OF SEPTEMBER 9, 1962:

Tuna landings by Norwegian fishermen amounted to 6,352 metric tons as of September 9, 1962--about 650 tons more than for the same period in 1961. Earlier reports this season indicated that the catch would be less than in 1961, but it now appears that it may be as good or better. Norway's total 1961 tuna landings were 6,582 tons with an export value of about \$2 million. The tuna fishing season in Norway is from July to October, with the main fishery for this species off West Norway.

Three tuna (weighing from 450 to 550 pounds) bearing United States tags were caught off Norway's coast since August 1962. (News of Norway, September 27, 1962.)

HERRING FISHERY TRENDS, SEPTEMBER 1962:

Summer Herring Catch: The Norwegian summer herring fishery off the coast of Iceland yielded a record catch of 139,500 metric tons in 1962. Fishermen were aided by unusually good weather in the summer of 1962. The good summer herring catch has considerably improved the prospects for Norwegian exports of industrial fish products.

Icelandic summer herring have provided Norwegian fishermen with an off-season fishery for many years. The fishery has become more important in recent years because of the declining Norwegian winter herring catch. The Icelandic summer herring is actually the same as the Norwegian winter herring. In the summer, the herring move from the coast of Norway to waters off Northern Iceland.

The decline of the Norwegian winter herring fishery left the West Coast meal and oil industry heavily overexpanded. The industry has been dependent on Government subsidy for a long time. It sought Government financing to ease the closing of some of the marginal producers. But the Department of Industry of Norway was reported to be re-

Norway (Contd.):

sisting the plan. (United States Embassy, Oslo, October 1, 1962.)

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FISHERY SALES ORGANIZATION'S
SALES AND EXPORTS SET RECORDS:

The joint sales organization of some 90 Norwegian fish freezing plants (Norsk Frosenfisk A/S) reported in October 1962 record sales and exports of its brand frozen fish products. In the operating year that ended June 30, 1962, sales rose 10,100 tons to total 37,000 metric tons. Total sales were valued at Kr. 128 million (US\$17.9 million), an increase of over Kr. 30.4 million (\$4.2 million), or 32.6 percent as compared with the 1960/61 fiscal year.

Nearly 34,000 tons went to export markets. This was 9,000 tons more than in 1960/61. The value of the exports rose 38 percent. Sales to the United States increased 50 percent, from about 4,000 tons to over 6,000 tons.

Despite these encouraging developments, the organization's annual report sounds a somber note about what will be in store if Norway does not join the European Economic Community. In that event, it says, the EEC import duty on frozen fish would give the Common Market frozen fish industry an 18 percent price advantage. In the long run, this would tend to reduce Norwegian exports to EEC. (News of Norway, October 25, 1962.)

* * * * *

NEARLY ALL EX-WHALERS
HAVE SHORE JOBS:

Early November 1962 reports from Vestfold, the heart of Norway's whaling industry, state that nearly all of the whalers idled by the reduction of the Antarctic whaling fleet from 7 to 4 expeditions had found jobs in industry, shipping, and agriculture. Only those over 60 have any real job problems. Business, however, is feeling the effect of the cutback as whaling companies spend much less locally.

In the 1961 season, about 130 residents of Larvik were employed as whalers. But, though none went to the Antarctic this fall, only two ex-whalers were unemployed. What the situation will be when the winter slack sets in remains to be seen.

A year earlier about 1,100 whalers came from Sandefjord and Sandar. In 1962, the number dropped to 600. Yet, only some 15-20 of the 500 whalers who had to stay on shore were registered as unemployed as of October 1. All the others have jobs.

A similar development is reported from Tonsberg, Notteroy, and Sem. In those three districts, some 700 whalers were recruited last season, and only half as many in the fall of 1962. Nevertheless, very few of the ex-whalers are idle. And these are all in the 60 and over age bracket. (Norwegian News of Norway, November 8, 1962.)

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NEW NORWEGIAN STERN
TRAWLER "HEKKTIND":

The annual marketable catch of the first Norwegian stern trawler Hekktind is expected to be about 1,800 metric tons of fresh iced gutted and headed cod. Built recently by a firm in Bergen, Norway, the Hekktind is a 151-foot welded vessel, 630 gross tons, equipped with a controllable pitch propeller, and a 1,300 b. hp. Diesel engine giving a speed of about 12 knots. There are two through steel decks.

The Hekktind is the product of extensive research in fishing vessel design and a detailed analysis of the fishing conditions under which it would operate. It has met expectations. The value of the Hekktind's catch in the first six months of 1962 was 885,000 kroner (US\$123,952), while operating costs including wages and bonuses to the crew amounted to 767,700 kroner (US\$107,524). The Hekktind lost only 8 hours fishing time in 1961 due to bad weather. It has hauled as much as 40 metric tons of fish through the stern chute without difficulty. The Hekktind's net has been hauled, emptied on deck, and reset on the bottom with 300 fathoms of cable out in only 15½ minutes. Hydraulic winches haul the net at an average rate of one fathom per second. Net handling and emptying time on deck amounts to less than 5 minutes. The trawl is handled on the upper deck while the fish are dressed on the lower deck. The fish hold is located midships for two reasons--shortest transportation from working space to hold and the practically nonexistent influence of the hold cargo on fore and aft trim of the vessel.

A catch of 159 metric tons can be unloaded from the Hekktind in 3 hours with

Norway (Contd.):

the use of forklifts because fish are stored in boxes on pallets. Fish are stored in welded aluminum boxes between layers of flake ice. The boxed fish are placed on pallets in the chilled hold where the temperature is kept at 0° to -2° C. (32° to 28.4° F.) by air circulating past cooling batteries. In order to have proper and evenly distributed chilling, the boxes are kept apart by pressed warts in the sides of the boxes. Fresh cod stored in this manner keep almost twice as long as fresh cod stored in the white painted wooden boxes on traditional vessels. Even ten-day-old cod from the Hekktind has passed as prime quality, whereas Norwegian fish inspectors do not usually accept fresh cod more than 4-6 days old as prime cod for filleting or freezing. The aluminum boxes can be kept clean and the boxes are stored on pallets in such a manner that drainage from a box does not contaminate the boxes underneath. The use of the pallet system reduces fish handling.

Since the Hekktind was designed mainly to land fresh fish for the filleting and freezing plants on the north coast of Norway, it does not have freezing equipment. It does have a chilling installation in the hold. The only processing equipment on board the vessel is a cod-liver oil plant which has not been found profitable.

The designers of the Hekktind have stated that they are willing to sell their designs for construction abroad. The vessel was built mainly for use in the Norwegian trawl fishery for cod, but the designers also had in mind using the vessel as a midwater trawler or a purse-seiner. Before the Hekktind was built, the designers made a study of sea and weather conditions throughout the year on the banks of the north coast of Norway, in the White Sea, and on the Bear Island and Spitsbergen grounds. They also tried to assess the possible total out-of-port time and the division of out-of-port time into actual fishing time (with the gear on the bottom), net handling time, and transport time. The assessment made them decide to build the vessel as a seagoing tug. The shelter deck design which was used makes it easier to store and preserve fish and adds to the safety and comfort of the crew.

Different trawls were studied and an analysis made of various methods of shooting

and hauling the gear. The emphasis was on finding the gear handling method which required the least time and a minimum effort on the part of the crew. The analysis guided the layout, length, and equipment of the trawl deck.

The lines and propulsion arrangement were developed by the Ship Model Test Basin attached to the Norwegian Technical University in Trondheim, Norway. The one hull form was agreed upon and tested according to normal test procedure. The hull form was also model-tested in waves of varying length, both from astern and ahead. The waves height-length ratio was held at 1:38. The tests showed that the model's movements (setting and pitching) were heaviest at wavelengths corresponding length between perpendiculars $\times 1.25$. Also the center of gyration, as intended, was clearly aft of midships. Thus the movements on the aftership should be reasonable and the water level at the ramp generally constant.

The captain of the vessel maintains that it will be able to fish under worse conditions than the British Fairtry-type vessels. The designers took into account the icing capacity of the vessel in studying the stability problem. The Hekktind's rightening arm (G. Z.) is at the maximum between 45-55° and tends to disappear at 80-90° under all conditions. The initial stability (G. M.) light vessel is 8½ inches and the total load of ice evenly distributed with half cargo and generally half empty tanks throughout is about 130 tons.

The designers of the Hekktind have built another stern trawler which is named the Vaagtind. The Vaagtind is similar to the Hekktind although the new vessel is described as having improvements to the bridge arrangements and handling facilities on the trawl deck.

The cost of constructing the Hekktind is not known but shipyard construction costs for fishing vessels in Norway average about as follows: labor and overhead costs 35 percent; steel and aluminum 20 percent; other materials and services (engines, pumps, subcontractor items, etc.) 45 percent. The cost of fishing gear for the Hekktind amounted to 160,000 kroner (US\$22,410).

The operating costs of the Hekktind during the first six months of 1962 were broken down as follows:

Norway (Contd.):

	Kroner	US\$
Compensation to 25-man fishing crew:		
Wages	63,000	8,824
Bonuses	305,500	42,788
Total compensation ¹	368,500	51,612
Management and administrative costs:		
Insurance on vessel and catch	56,000	7,843
Management and administration	14,800	2,073
Incidentals	3,000	420
Travel	13,400	1,877
Dues to fisheries association	23,700	3,319
Total management and administrative costs	110,900	15,532
Fuel and supplies:		
Provisions	14,600	2,045
Fuel and lubrication oil	125,300	17,550
Maintenance	53,300	7,465
Stores, deck machinery, etc.	9,100	1,275
Maintenance of gear	86,000	12,045
Total fuel and supplies	288,300	40,380
Total costs	767,700	107,524

¹ Crew compensation averages about 35 percent of the value of the catch.

The Hekktind's logbook shows that out-of-port time in 1961 was broken down as follows: transport to and from the fishing grounds--33.2 percent; trawling with gear on the bottom--53 percent; gear handling--9.8 percent; and miscellaneous interruptions--4 percent. The owners hope to keep the Hekktind at sea for 320 days a year. The plan is based on full use of the pallet system for unloading and taking on ice and allows for twice yearly dry-docking.

About 75 percent of the actual catch of the vessel as landed on deck consists of marketable cod. The remainder (flatfish, a few ocean perch or redfish, and some undersized cod) is discarded. Heading and gutting the cod results in a loss in weight of 8 to 10 percent for viscera and 16 to 20 percent for heads. In early October, the Norwegian ex-vessel price for prime headed and gutted cod was 0.9 to 1.0 kroner per kilogram (6.4 U.S. cents a pound). About 90 percent of the Hekktind's catch of marketable cod meets the test for prime fresh cod and is sold for filleting and freezing. The balance of the cod is sold for drying at a somewhat lower price.

Up to 85 percent of the cost of constructing Norwegian fishing vessels may be provided by low-interest Government loans. The Fisheries Bank may finance 60 percent of construction costs with a long-term loan bearing 2-3 percent annual interest. The North Norway Development Fund may finance an additional 20 to 25 percent of the costs with a loan at 4 percent interest repayable usually in 12 years. In some cases the first repayment on loans is not due for 4 or 5 years. Norwegian trawlers are also aided by the current subsidy on cod landings which amounts to 0.05 kroner per kilogram (32

U. S. cents per 100 pounds). (European Regional Fisheries Attache, United States Embassy, Copenhagen, September 26 and October 3, 1962.)

Note: One Norwegian kroner equals US\$0.14.



Peru

EXPORTS OF PRINCIPAL MARINE PRODUCTS, JANUARY-JUNE 1962:

Item	Quantity	Value ¹	
		Metric Tons	Million Soles
Fish meal	588,481	1,473.6	54,965
Fish oil	61,238	155.7	5,808
Fish (froz., canned, etc.) ..	16,644	117.1	4,368
Fertilizer (guano)	4,427	11.9	444
Sperm oil	2,463	8.6	321
Whale meal	1,564	2.5	93

¹ F.o.b. values converted at rate of 26.81 soles equal US\$1. (United States Embassy, Lima, October 3, 1962.)

* * * * *

FISH MEAL MARKETING ORGANIZATION GAINS LEGAL CONTROL OVER PERUVIAN FISH MEAL EXPORTS:

A Peruvian Decree-Law No. 14228 has the effect of giving the Consorcio Pesquero del Peru S. A. (Peruvian marketing organization for fish meal producers) complete control over all Peruvian fish meal exports. The Decree was published November 5, 1962, in El Peruano by the Peruvian Government. The Decree applies to the export of raw materials (materias primas). (Editor's note: fish meal is classified as a raw material by the Peruvian Government.) The Decree establishes the requirement that where two-thirds of the producers of a raw material, accounting for two-thirds of the national production, are formed into an export cooperative, all other producers must sell through the cooperative. (United States Embassy, Lima, November 8, 1962.)

* * * * *

GOVERNMENT'S NEW PROCEDURES FOR FISH MEAL PLANT LICENSES:

New requirements for issuance of licenses to fish meal plants in Peru are included in a law published in El Peruano, August 29, 1962. When published, the law was erroneously designated as Decree-Law No. 14195. The correct title is Supreme Decree No. 11.

Regulations covering procedures under Supreme Decree No. 11 are contained in

Peru (Contd.):

Ministerial Resolution No. 4965, dated September 27, 1962, which was published in El Peruano, October 31, 1962. (United States Embassy, Lima, November 5, 1962.)



Ryukyu Islands

TUNA FISHING TRENDS:

Japanese tuna vessels have always been in demand by tuna fishermen of Okinawa. In the fall of 1962, a 196-ton vessel registered at Ishmomaki, Japan, was sold to a Naha, Okinawa, firm.

At Naha, there are some 20 skipjack tuna vessels of more than 100 tons each operating. Naha is used as their base. Also, about 100 Japanese fishing vessels from 80-350 tons each are engaged in tuna long-line, skipjack hook-and-line, and mackerel fishing in southern (Pacific) fishing grounds and in inshore waters.

In tuna fishing, a 200-ton-class vessel can catch US\$18,000 worth of fish per fishing trip lasting about two months. This nets each crew member \$150-\$300. One-third of the catch is consumed on Okinawa and two-thirds is exported to the United States. While albacore and yellowfin tuna are high-priced, bluefin tuna are sold at fairly low prices in Okinawa. Fishing firms in Okinawa are either chartering vessels from Japan or buying them, since equipment and techniques of local shipbuilding are not up to the recognized standards. (Suisan Keizai Shimbun, October 5, 1962.)



South Africa Republic

NEW DIRECT SHIPPING POINT FOR FISH MEAL:

Saldanha Bay, north of Cape Town, may become a new direct shipping point for fish meal produced in South Africa. Formerly, ocean cargo from the Bay area was shipped by rail or coastal vessel to Cape Town. It is hoped that the recent initial shipment of 590 tons of bagged fish meal will prove the feasibility of loading ocean freighters at

Saldanha. (South African Shipping News and Fishing Industry Review, July 1962.)

PARTICIPATION IN INDIAN OCEAN RESEARCH:

The South African research vessel Africana II this summer completed a 30-day cruise of about 4,200 miles to the southern Indian Ocean as part of that country's contribution to the International Indian Ocean Project being conducted by 12 countries. South Africa is the only continental African country taking part in that study. (Various sources.)



Spain

BILBAO TUNA FISHERIES TRENDS, THIRD QUARTER 1962:

Landings of "bonito" (the local name for albacore tuna) in the Bilbao area of Spain from Cantabrian waters during the 1962 season were about the same as in 1961. The demand for canned tuna in the domestic and foreign markets was good. Average ex-vessel prices this year were reported as 30-31 pesetas a kilogram (US\$500-517 a metric ton) for round or whole albacore tuna as compared with 23-24 pesetas a kilogram (\$384-400 a metric ton) in 1961. Retail prices for fresh albacore in 1962 averaged 60 pesetas a kilogram (45 U. S. cents a pound) as compared with 45 pesetas a kilogram (34 cents a pound) in 1961.

During October 1962, negotiations were under way between local fishing vessels and the United States canning firm, which handled their catches during the winter fishing season off the west coast of central Africa. The United States firm has expanded its freezing facilities on Africa's west coast. There seemed to be some interest in the vessels making trips to West Africa, but part of the local fishing fleet was going to change its plans of operation, and for the first time will get support from Spanish vessel owners.

A Bilbao fishing vessel owner remodeled the former coast cargo vessel Barazar by installing a freezing unit on the vessel. The Barazar, which has a maximum cargo-carrying capacity of 930 metric tons, was built in Bilbao in 1957, and will accompany the fleet

Spain (Contd.):

to the African fishing grounds. Ten fishing vessels will transfer their tuna catches to the Barazar to be frozen, and will in turn be supplied with ice, provisions, and any medical assistance that is needed. The remodeled vessel was expected to be operating in the very near future.

For the 1963/64 tuna fishing season, the same firm also plans to operate a sistership to the Barazar, which is now being built in a local shipyard. In addition, the company will send another vessel, the Aralar with a capacity of 800 metric tons, to operate as a refrigerator vessel. The Aralar is now being built with Government financing at an estimated cost of 40 million pesetas (about US\$667,000). The Aralar will bring frozen fish to Spain from the Barazar, and will in turn supply the freezer vessel with provisions, medical supplies, and mail from Spain. (United States Consulate, Bilbao, October 11, 1962.)



Tunisia

TERRITORIAL WATERS EXTENDED:

Formal notice of Tunisia's claim to extended territorial waters was given by the publication of Law No. 62-35, October 16, 1962, in the Tunisian Official Journal of the same date. Subsequently, the Chief of the American Section in the Foreign Affairs Secretariat reported that Tunisia's claims were as published, with particular reference to the extension of her territorial waters to the fifty-meter isobath line from south of Ras Kapoudia to the Libyan frontier. (United States Embassy, Tunis, November 2, 1962.)



U.S.S.R.

FISHERY EXPLORATION IN BERING SEA:

Two Soviet medium trawlers this summer were exploring for fish in the central Bering Sea. Some drags were made at depths of 700 meters (2,300 feet) and attempts were to be made to fish down to a depth of 1,000 meters (3,280 feet). One haul yielded about 1,750 pounds of sablefish and ocean perch. (Unpublished sources.)

FISHING FLEET EXPANSION AND 1961 CATCHES:

In the next ten years, the Soviet Union expects to add about 1,000 large and medium fishing vessels to the fleet.

In 1961, catches by medium trawlers (SRT's) varied widely. SRT's operating out of Murmansk each took 600 metric tons during the year; Leningrad craft caught 500 tons per vessel; and the Far East fleet averaged 1,200 tons per trawler. Fishing time per vessel ranged from 23 percent to 46 percent of total time away from port. (Unpublished sources.)

STERN TRAWLER RETURNS FROM WEST AFRICA:

The Tropik, new Soviet stern trawler built especially for operations in tropical waters, completed its maiden voyage to West African waters this summer. The vessel and its equipment reportedly did not meet expectations. (Unpublished sources.)

TWO-BOAT TRAWL USED IN NORTH ATLANTIC:

Two Soviet medium trawlers this summer were fishing a two-boat trawl in the North Atlantic. Catches ranged up to 40 metric tons of herring per haul. (Unpublished sources.)



United Kingdom

FISHERY STUDIES BY HUMBER LABORATORY:

Expansions carried out at the Humber Laboratory, Hull, England, over the past nine years were to enable closer liaison with and to solve special problems of the English fishing industry. The current program of work of the laboratory can be summarized as follows:

1. The development of a trawler with a vertical plate freezer for catch-freezing at sea.
2. Pilot plant for the dielectric thawing of frozen fish blocks, using a current of 5,000 volts at a frequency of 36 megacycles per second. (Fish blocks are thawed from an

United Kingdom (Contd.):

original temperature of -20°F . to $+30^{\circ}\text{F}$. in a period of 15 minutes.)

3. An improved sampling technique for testing fish freshness on arrival at port by measuring the quantity of trimethylamine present in fish.

4. An apparatus for measuring the toughness of fish meat. A small sample of fish is broken up in water mechanically, and the resultant opacity of the mixture is measured in

a colorimeter which provides a direct indication of toughness.

5. A survey to establish the edible value of fish exposed to temperatures ranging from 30° to 80°F .

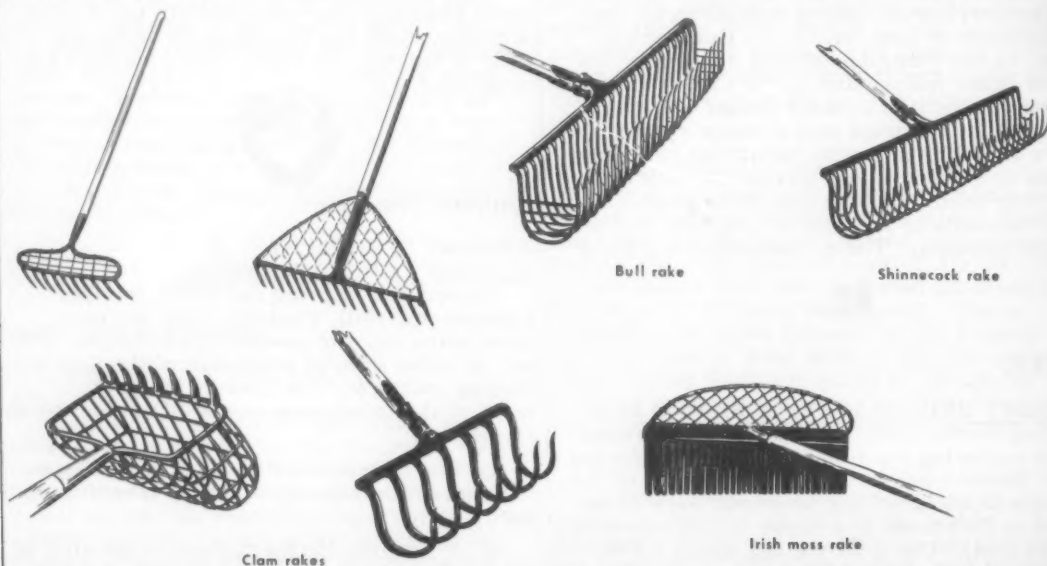
6. The development of a resistance spear thermometer that provides an instantaneous temperature reading of fish in transit and which can also be utilized in cold storage plants and laboratories; the instrument has an accuracy of $\pm 0.2^{\circ}\text{F}$. (*Bulletin de L'Institut International du Froid*, Vol. XLII, no. 4, 1962.)



RAKES

There are two different types of rakes used in the commercial fisheries. They are the common clam rake and the bull rake. The common rake for clams is much like a garden rake except that the teeth are longer and sharper. It is equipped with a wire mesh basket or apron which holds the catch. It is generally used in very shallow water. There are many modifications which are used in different areas. One of the modifications, in Maine, is used for gathering Irish moss. The bull rake is a large implement with a head between twenty and thirty inches wide. It has long curved teeth about nine inches long and unlike the common hand rake it does not have a basket or apron. Its handle is usually longer and is fished in deeper water than the hand rake. The bull rake is used generally in New England.

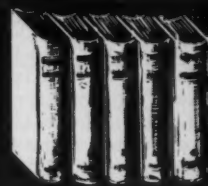
The Shinnecock rake is a modified New England bull rake used only in Maryland. The long curved teeth are progressively smaller towards the ends of the rake head. This forms a basket on which the clams rest as they are raised from the bottom.



Note: Excerpt from Circular 109, *Commercial Fishing Gear of the United States*, for sale from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., single copy, 40 cents.



FEDERAL ACTIONS



Department of Commerce

AREA REDEVELOPMENT ADMINISTRATION

INDUSTRIAL LOAN TO FISHERY FIRM IN WASHINGTON STATE APPROVED:

A \$455,000 industrial loan to help Farwest Fisheries, Inc., to establish a tuna canning plant at Anacortes, Wash., has been approved by the Area Redevelopment Administration (ARA) of the U. S. Department of Commerce. Sixty new jobs will be created in the new tuna canning plant. Farwest Fisheries, Inc., of Anacortes will establish the tuna cannery by purchasing an existing salmon cannery, expanding cold storage and dock space, and buying new machinery and equipment to process and can tuna.



Canning tuna.

Installation of the tuna canning facilities will permit year-round operation of the cannery. It will help stabilize employment in Anacortes, which is affected by such seasonal industries as tourism, salmon fishing, and fruit and vegetable packing.

The ARA loan, repayable over a 20-year period and bearing an annual interest rate of 4 percent, will finance only part of the cost of the new tuna cannery. A fishery products brokerage company in the State of Washington will purchase a \$100,000 participation in the ARA mortgage. The total cost of the Anacortes project will be \$700,000. In addition to the Federal funds, a bank in Anacortes will invest \$140,000; a local nonprofit organization known as Skagit County Development Association will contribute \$70,000; and Farwest Fisheries, Inc., is putting \$35,000 of its own funds into the project.

Anacortes is in Skagit County, Wash., which was designated as eligible to participate in the Area Redevelopment program because of persistent and substantial unemployment and underemployment over an extended period of time.

The Small Business Administration investigated the Anacortes project and made recommendations which led to approval of the loan by ARA. The U. S. Bureau of Commercial Fisheries also played a key role in the investigations which preceded ARA approval of the project.



Department of Health, Education and Welfare

FOOD AND DRUG ADMINISTRATION

SURVEY OF STATE AND LOCAL FOOD AND DRUG LAWS:

A survey of state and local food and drug laws and the facilities for their enforcement will get under way this year, according to an October 15, 1962, announcement by the Commissioner of the U. S. Food and Drug Administration.

The survey, long sought by state and Federal food and drug officials, is made possible by \$300,000 which Congress included in this year's appropriation for the Federal agency. Representatives of the Association of Food and Drug Officials of the United States and the Food and Drug Administration held a planning session October 5.

The objective of the survey is to determine what improvements are needed in laws, resources, and facilities of agencies concerned with protecting consumers of foods, drugs, devices, cosmetics, and household chemical products. The study will be made by a nonprofit research organization outside the Government.

PUBLIC HEALTH SERVICE

**SHELLFISH SANITATION CENTERS
TO BE IN OPERATION IN 1963:**

The new shellfish sanitation research centers at Kingston, R. I., and Dauphin Island, Ala., of the U. S. Public Health Service are expected to be in operation by July 1963. Both centers will engage in research designed to assess pollution dangers in shellfish growing areas and develop new ways to safeguard the sanitary quality of market oysters, clams, and mussels.

Scientific staffs in both centers will engage in microbiological, radiological, and toxicological studies as well as give technical assistance and training to state personnel engaged in shellfish sanitation activities. An estimated 65 scientists, technologists, and supporting staff will be employed in the Kingston facility to provide research and training assistance to New England shellfish-growing states. An estimated staff of 35 will be employed at Dauphin Island to provide such support to South Atlantic and Gulf Coast shellfish-growing states.

Recruitment of bacteriologists, chemists, laboratory technicians, marine biologists, oceanographers, sanitary engineers and others is currently under way by the Service's Division of Environmental Engineering and Food Protection, Washington 25, D. C.

**Department of the Interior****UNITED STATES STRIVES TO
REHABILITATE ITS FISHING INDUSTRY:**

The most intensive oceanographic research program in the history of the United States, part of an Administration drive to rehabilitate the Nation's fishing industry, was cited in October 1962 by Secretary of the Interior Stewart L. Udall as "a vital part of an unequalled conservation record attained to date through Departmental actions and those of the 87th Congress." His remarks accompanied the submission of a 32-page report outlining what he termed "an all-time high-water mark in conservation and resource management."

The report's section on oceanography cites the "long-overdue recognition" provided marine research, involving the building of three new ocean-going laboratories, the conversion of two Navy tugs for the same purpose, and the commissioning in early 1963 of the all-season, all-weather fishery research *Albatross IV*. During coming months, work also will start on new fisheries research laboratories at La Jolla, Calif., Ann Arbor, Mich., Beaufort, N. C., and Seattle, Wash.

Additional recognition of the growing need for knowledge, particularly among young students, of our fishery resources,

was provided by Congress in authorizing expenditure of \$10 million to provide the Nation's Capital with an outstanding fishery research center and aquarium.

"Fishing as a United States industry has in many areas lagged competitively behind other nations that are making great technological strides," Secretary Udall said. To restore the prosperity of the United States fishing industry and to guarantee consumers ample supplies of protein-rich fishery products, accelerated programs are under way involving laboratory research, ocean surveys, construction of hatcheries, fish-survival facilities at dams, and provisions for industry loans.

"Additionally, through research conducted by U. S. Bureau of Commercial Fisheries scientists, the United States has now taken a lead in an intensified program to develop a marketable fish protein concentrate which not only can provide an important economic stimulus to the domestic fishing industry, but can provide a dramatic new answer to the world's hunger problems."

Secretary Udall estimated there are approximately from 7 to 9 million tons of fish not presently harvested in United States waters that can be utilized to produce fish protein concentrate (FPC). "Processing FPC will allow our fishing fleets to become year-round operations, rather than seasonal," he said.

Other high points in the conservation accomplishments report included:

1. A vigorous new Water Pollution Control Act is mounting a full-scale attack on one of our most destructive forms of waste;
2. National investment in water conservation and development projects has reached an all-time high, including two major reclamation projects.
3. A new marine laboratory has been established at Sandy Hook, N. J., to study management of salt-water sport fish--the basis of a growing industry, and a national reservoir fishery research program has been launched with establishment of two new research centers in South Dakota and Arkansas.
4. At President Kennedy's request, a special Interagency Committee on Oceanography has been established to coordinate an expanded long-range program of oceanographic research designed to meet the divergent needs of commerce, defense, atomic energy development, and production of mineral and fishery resources.
5. Educational grants have been provided oceanographers and other marine scientists; vast areas of the ocean are being surveyed; new programs, both construction and research, are under way to assist salmon migration over dams; more than a million dollars in ARA loans has provided economic stimulus and a fishing vessel construction subsidy program is under way in New England.
6. Valuable new progress has been made in studies of diseases and pesticides as a result of the establishment of the new Federal Pest Control Review Board.

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

**NEW ASSISTANT REGIONAL DIRECTOR
APPOINTED FOR GREAT LAKES
AND CENTRAL REGION:**

Ernest D. Premetz, Assistant Chief of the Branch of Marketing, U. S. Bureau of Commercial Fisheries, Washington, D. C., has

been appointed Assistant Regional Director of the Bureau's Great Lakes and Central Region, with headquarters at Ann Arbor, Mich., the Department of the Interior announced on October 18, 1962. The appointment was effective October 28.

The Great Lakes and Central Region includes Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Tennessee, Wisconsin, and those portions of New York and Pennsylvania bordering the Great Lakes.

Premetz entered Federal service as an aquatic biologist in 1949. As Fishery Research Biologist, he was associated with the flounder and haddock investigations at New Bedford and Woods Hole, Massachusetts, until 1954, when he was assigned to Washington, D. C., to participate in the Departmental Management Training Program. He joined the Branch of Marketing in August 1955 and headed up the industrial utilization program in the Great Lakes area with headquarters at Sheffield Lake, Ohio. Later, he was detailed to Washington, D. C., for 3 months as a member of a 4-man task force to help develop a long-range program for the Bureau of Commercial Fisheries; and in May 1958, he was transferred to Washington, D. C., as Assistant Chief, Branch of Marketing.

SPORT FISHERIES AND WILDLIFE

TWO FISHERY RESEARCH STATIONS DEDICATED:

Two Fish and Wildlife Service fishery research stations, one in Wisconsin for fish population control studies and one in Arkansas to work on fish-farming experiments, were dedicated during the week of October 21, 1962, the U.S. Department of the Interior announced.

The Fish-Farming Experimental Station was dedicated October 21, at Stuttgart, Ark. The work at that station is designed to find ways of growing fish profitably in conjunction with rice and other agricultural crops. This station has a modern laboratory, fish-holding facilities, shop, garage, and storage buildings, plus several reservoirs and holding ponds.

Some of the problems to be solved are: water quality and levels; control of aquatic vegetation; overpopulation; predation; disease and parasite infestations; feeding; and brood stock selection.

The Station is under the administration of the Fish and Wildlife Service's Bureau of Sport Fisheries and Wildlife. The Service's Bureau of Commercial Fisheries is cooperating on improving processing, merchandising, and distributing methods for fishery products produced through fish-farming techniques.

The Fish-Control Laboratory in La Crosse, Wis., was dedicated on October 25 in conjunction with the Tri-State Fishery Conference.

The Fish-Control Laboratory at La Crosse was established to develop the necessary tools for controlling unwanted fish populations. Although the search for better chemical toxicants will be the initial objective of the station, other methods of control will also be studied.

Chemical removal of fish populations is not new. The technique was largely developed in the North-Central States and has been widely used for decades. These toxicants will not harm other forms of wildlife living in or near the water or human beings who might drink the water. Future emphasis, however, will be on the search for toxicants that will be even more selective, controlling certain unwanted fish without harming the more desirable kinds.

To carry out this intensive research program, a staff of chemists, biologists, and other specialists has been assembled at the La Crosse station. Considerable remodeling of buildings has been completed to provide adequate research facilities.

These two research stations of the U.S. Fish and Wildlife Service are expected to make a major contribution toward improved fresh-water sport and commercial fishing.



Department of Labor

WAGE AND HOUR AND PUBLIC CONTRACTS DIVISIONS

EXPIRATION DATE EXTENDED ON HANDICAPPED WORKER CERTIFICATES ISSUED TO SHELLFISH INDUSTRY:

The expiration date of handicapped worker certificates issued to workers in the shellfish industry has been extended to January 31, 1963. The extension was made by the U. S. Department of Labor under Section 524.12 of 29 CFR Part 524 pending completion of analysis of a survey of the shellfish industry conducted by the Bureau of Labor Statistics of the U. S. Department of Labor. The survey by that Bureau may affect future Department of Labor rulings concerning the shellfish industry. In the case of new applications for handicapped worker certificates submitted before January 31, 1963, present standards and procedures will continue to be used in the issuance of certificates.

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CONDITIONS GOVERNING EMPLOYMENT OF LEARNERS AT SUBMINIMUM WAGE RATES:

The conditions governing the issuance of a certificate by the U. S. Department of Labor authorizing the employment of learners at wage rates below the statutory minimum are described in Section 522.5 of 29 CFR Part 522, Employment of Learners, as follows:

Section 522.5: Conditions governing issuance of a learner certificate.

The following conditions shall govern the issuance of a special certificate authorizing the employment of learners at subminimum wage rates:

(a) An adequate supply of qualified experienced workers is not available for employment; the experienced workers presently employed in the plant in occupations in which learners are requested are afforded an opportunity, to the fullest extent possible, for full-time employment; learners are available for employment; and the granting of a certificate is necessary in order to prevent curtailment of opportunities for employment.

(b) Reasonable efforts have been made to recruit experienced workers, including the placement of an order with the local State or Territorial Public Employment Service Office (except in possessions where there is no such office) not more than fifteen days prior to the date of application. Written evidence from such office that the order has been placed shall be submitted by the employer with the application.

(c) The issuance of a learner certificate will not tend to create unfair competitive labor cost advantages nor have the effect of impairing or depressing wage or working standards established for experienced workers for work of a like or comparable character in the industry.

(d) Abnormal labor conditions such as a strike, a lock-out, or other similar condition, do not exist at the plant for which a learner certificate is requested.

(e) There are no serious outstanding violations of the provisions of a learner certificate previously issued to the company, nor have there been any serious violations of the act which provide reasonable grounds to conclude that the terms of a certificate may not be complied with, if issued.

(f) The occupation or occupations in which learners are to receive training involve a sufficient degree of skill to necessitate an appreciable training period.

(g) Learners shall be afforded every reasonable opportunity for continued employment upon completion of the learning period.



U. S. Tariff Commission

PROPOSED CHANGES IN IMPORT TARIFF SCHEDULES INCLUDE FROZEN FISH BLOCKS AND MONOFILAMENT GILL NETS:

A proposal for a Fourth Supplemental Report of changes in the Tariff Schedules of the United States necessary to reflect changes made in the tariff treatment of imported articles as set forth by various statutes and administrative and judicial rulings has been made public. The notice by the U. S. Tariff Commission was published in the Federal Register of October 31, 1962.

The only fishery product listed is frozen fish slabs, and the description reads: "skinned or boned, whether or not divided into pieces, and frozen into slabs each weighing over 10 pounds, imported to be minced, ground, or processed into fish sticks." The proposed change will remove the fish slabs or blocks from items Number 110.50, 110.55, 110.57, 110.60, 110.61, and establishes a new class 110.47. "The change incorporates the substance of customs practices based upon recent court rulings (Customs Decisions 2327 and 2340). The principle of these rulings cannot be effectively administered except by following the fish into consumption." These decisions provide for entry of fish blocks or slabs under paragraph 720(b) of the Tariff Act of 1930 which carries a rate of 1 cent a pound rather than duties which could range from 1½ to 2½ cents a pound under paragraph 717(b).

Also listed are monofilament gill nets, and the change provides for the free importation of that type net for fish sampling.

A public hearing was held on November 16, 1962, in the Tariff Commission Building, Washington, D. C.



Treasury Department

COAST GUARD

AMENDED FEDERAL REGULATIONS FOR PORT SECURITY CARDS:

A change has been announced in the Federal Regulations for Coast Guard Port Security Cards. The new regulations became effective on publication in the Federal Register of November 15, 1962.

(a) Only the following persons may be issued Coast Guard Port Security Cards:

1. Persons regularly employed on vessels or on waterfront facilities.
2. Persons having regular public or private business connected with the operation, maintenance, or administration of vessels, their cargoes, or waterfront facilities.

(b) A holder of a Merchant Mariner's Document, Validated for Emergency Service, shall not be issued a Port Security Card, unless he surrenders the Merchant Mariner's Document to the Coast Guard. In this connection, see Section 125.09.

The regulations are covered by Title 33--Navigation and Navigable Waters, Chapter 1--Coast Guard, Department of the Treasury, Subchapter L, Section 125.17.



Eighty-Seventh Congress

(Second Session)

The 87th Congress adjourned "sine die" on October 13, 1962. Bills not completed during this Congress are "dead" and do not carry over to the 88th Congress, which will convene on January 9, 1963. This means that bills if and when re-introduced must go through the entire process of committee consideration, hearings etc.



GLOUCESTER HARBOR (MASS.) IMPROVEMENT: H. Doc. 341, Gloucester Harbor, Massachusetts, Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated Oct. 6, 1961, submitting a report, together with accompanying papers and an illustration, requested by resolutions of the Committee on Public Works, House of Representatives, adopted Mar. 30, 1955.

GREAT LAKES HARBORS STUDY: H. Doc. 340, Great Lakes Harbors Study--Second Interim Report on Erie Harbor, Pennsylvania, Letter from the Secretary of the Army transmitting a letter from the Chief of En-

gineers, Department of the Army, Dated Oct. 6, 1961, submitting a report, together with accompanying papers and an illustration, requested by resolutions of the Committees on Public Works, United States Senate and House of Representatives, adopted May 18, 1956 and June 27, 1956.

H. Doc. 415, Great Lakes Harbors Study--Interim Report on Conneaut Harbor, Ohio, Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated Jan. 17, 1962, submitting a report, together with accompanying papers and an illustration, requested by resolutions of the Committees on Public Works, United States Senate and House of Representatives, adopted May 18, 1956, June 27, 1956, and June 3, 1959, respectively. It is also in full response to a resolution of the Committee on Public Works, House of Representatives, adopted Apr. 13, 1948.

H. Doc. 496, Great Lakes Harbors Study--Interim Report on Kenosha Harbor, Wisconsin, Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated June 20, 1962, submitting a report, together with accompanying papers and an illustration, requested by resolutions of the Committees on Public Works, United States Senate and House of Representatives, adopted May 18, 1956, April 30, 1957, and June 27, 1956. It is in final response to a resolution of the Committee on Public Works, House of Representatives, adopted July 31, 1957.

H. Doc. 474, Great Lakes Study--Interim Report on the Muskegon Harbor, Michigan, Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated Apr. 30, 1962, submitting a report, together with accompanying papers and an illustration, requested by resolutions of the Committees on Public Works, United States Senate and House of Representatives, adopted May 18, 1956, and June 27, 1956.

H. Doc. 451, Great Lakes Harbors Study--Second Interim Report on the Buffalo Harbor, New York, Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated May 18, 1962, submitting a report, together with accompanying papers and an illustration, requested by resolutions of the Committees on Public Works, United States Sen-

ate and House of Representatives, adopted May 18, 1956 and June 27, 1956.

HARBOR IMPROVEMENTS: S. Doc. 106, Key West Harbor, Florida, Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated June 1, 1962, submitting a report, together with accompanying papers and an illustration, requested by a resolution of the Committee on Public Works, United States Senate, adopted Mar. 15, 1951.

H. Doc. 500, Searsport Harbor, Maine, Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated June 22, 1962, submitting a report, together with accompanying papers and an illustration, requested by a resolution of the Committee on Public Works, House of Representatives, adopted June 3, 1959.

H. Doc. 482, Portsmouth Harbor and Piscataqua River, Maine and New Hampshire, Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated June 1, 1962, submitting a report, together with accompanying papers and illustrations, requested by resolutions of the Committees on Public Works, United States Senate and House of Representatives, adopted Nov. 18, 1958, and June 3, 1959.

S. Doc. 101, Tacoma Harbor, Port Industrial and Hylebos Waterways, Washington, Letter from the Secretary of the Army trans-

mitting a letter from the Chief of Engineers, Department of the Army, dated May 4, 1962, submitting a report, together with accompanying papers and illustrations, requested by a resolution of the Committee on Public Works, United States Senate, adopted May 27, 1955.

MEDICAL CARE FOR VESSEL PERSONNEL: Medical Care for Self-Employed Fishermen (Hearing before the Merchant Marine and Fisheries Subcommittee of the Committee on Commerce, U. S. Senate, 87th Congress, 2nd Session, on S. 367, to provide medical care for certain persons engaged on board a vessel in the care, preservation, or navigation of such vessel May 2, 1962), 90 pp., printed. Contains statements given by personnel of various Federal agencies and industry people; letters and various other correspondence submitted to the Committee; and reports from Federal agencies.

TRADE EXPANSION ACT OF 1962: H. Doc. 598, Free Trade, Tariff Legislation, and Common Markets for the Western Hemisphere: A Collection of Excerpts and Selected References, House of Representatives, 87th Congress, 2nd Session, 76 pp., printed (prepared by the Economics Division, Legislative Reference Service, Library of Congress). Contains excerpts and selected bibliography on free trade and protective tariffs, the 1962 trade expansion legislative proposals, and excerpts and selected references on Western Hemisphere common markets.



Created in 1849, the Department of the Interior--America's Department of Natural Resources--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.



CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

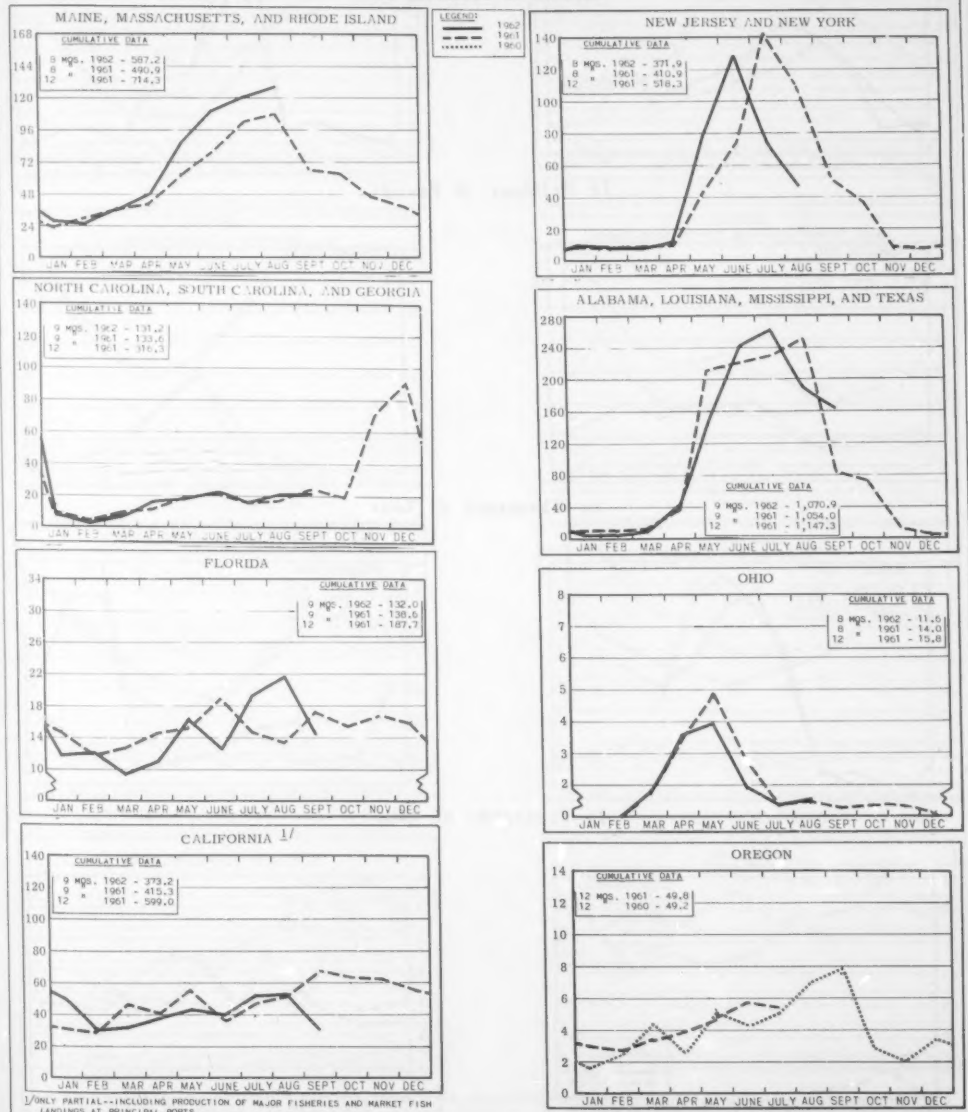
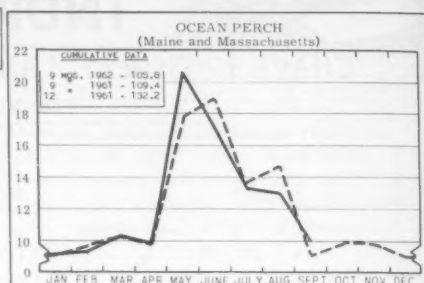
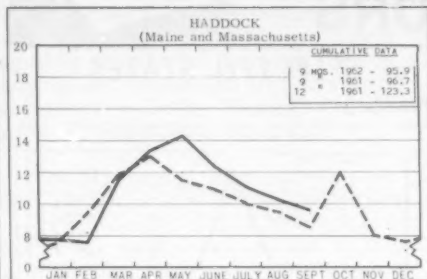
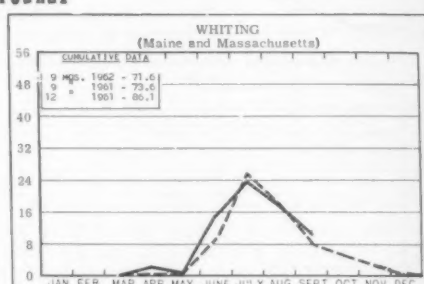
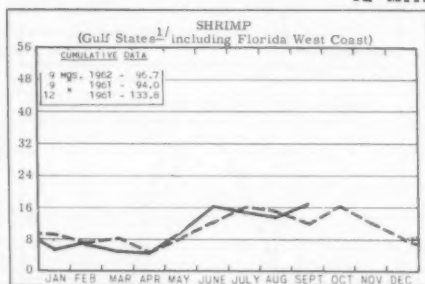


CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

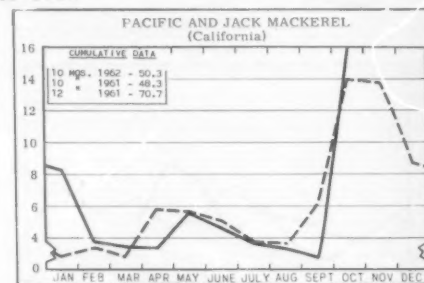
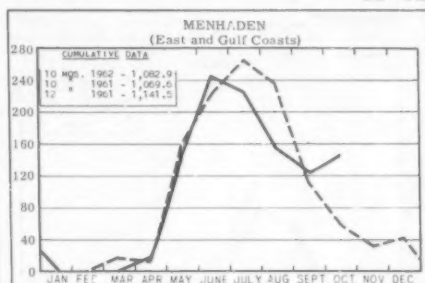


In Millions of Pounds



^{1/2}LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



In Thousands of Tons

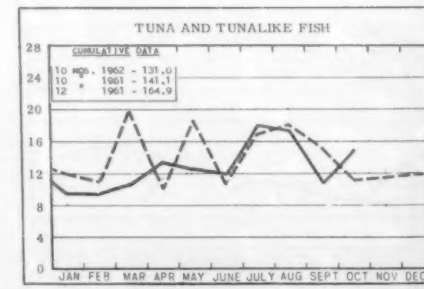
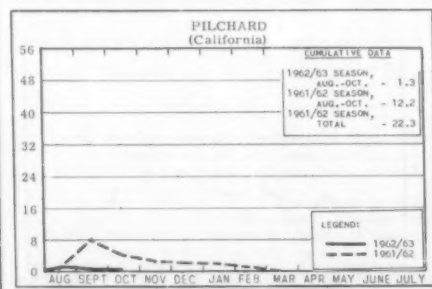
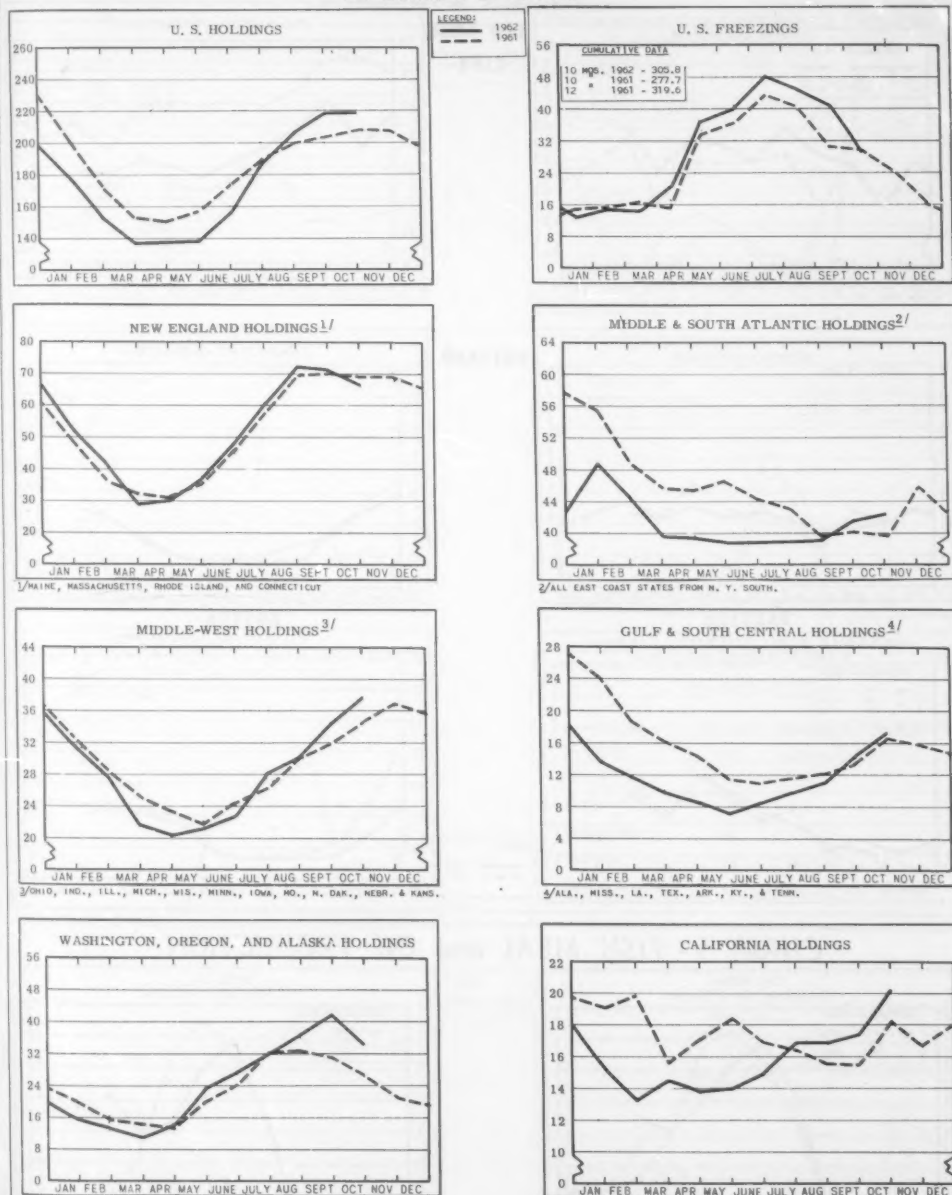


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

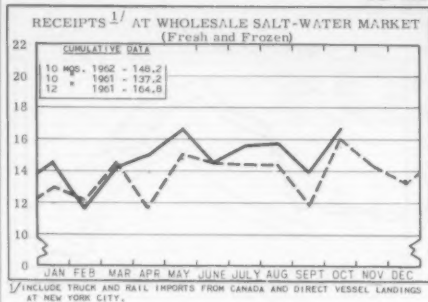
In Millions of Pounds



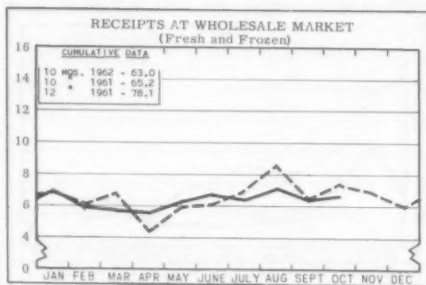
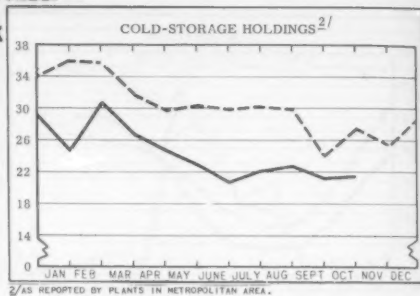
* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

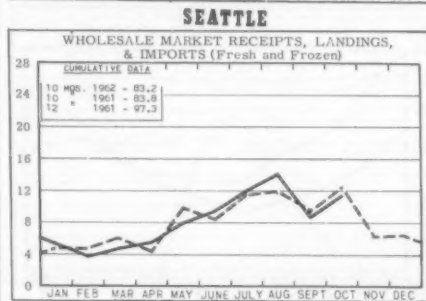
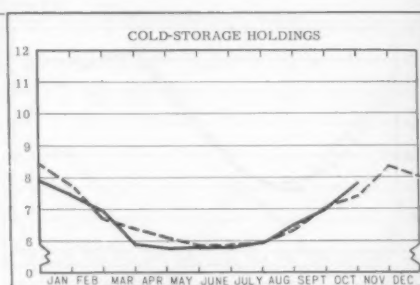
In Millions of Pounds



NEW YORK CITY



CHICAGO



LEGEND:
— 1962
--- 1961

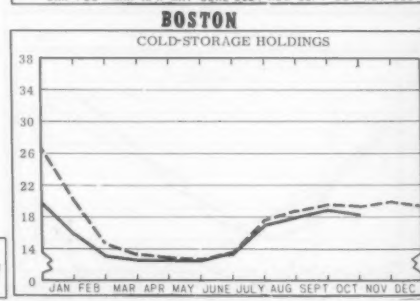


CHART 5 - FISH MEAL and OIL PRODUCTION

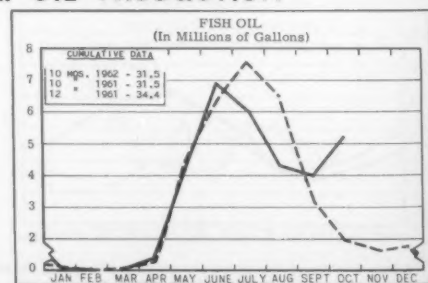
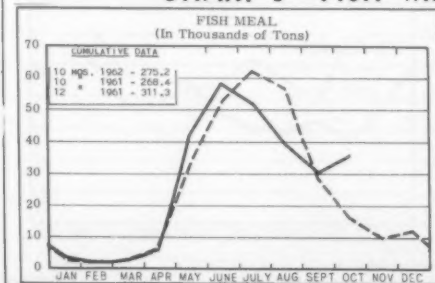
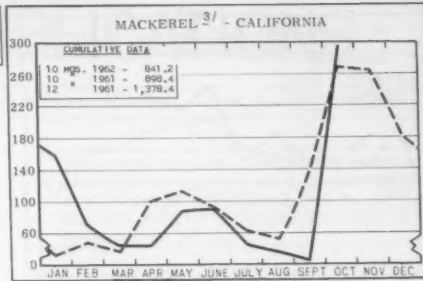
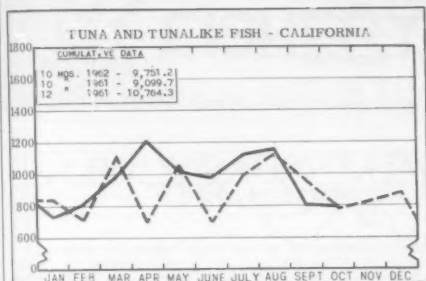
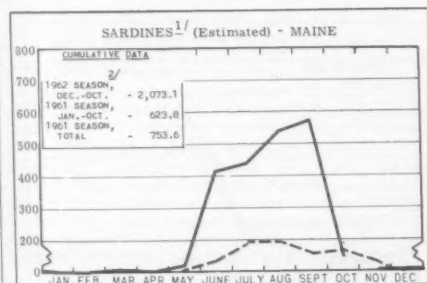
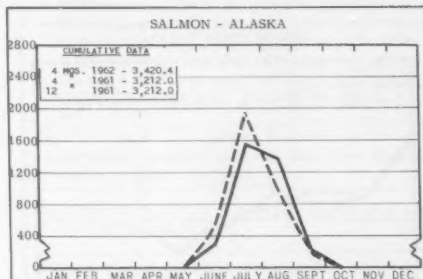
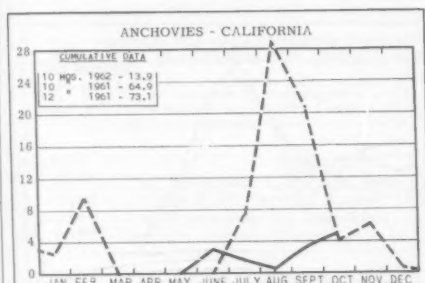


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases

^{3/} INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.^{1/} INCLUDING SEA HERRING. ^{2/} THE 1962 SEASON STARTED DEC. 2, 1961.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	$\frac{1}{2}$ drawn	3 $\frac{1}{2}$ oz.
SHRIMP.....	48	--	3 oz.
TUNA.....	48	# $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	$\frac{1}{2}$ -lb.	8 oz.

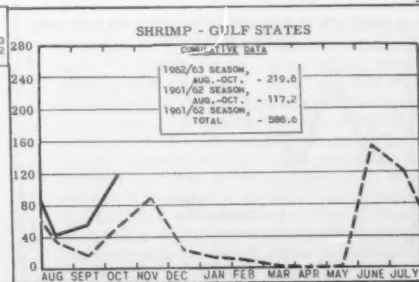
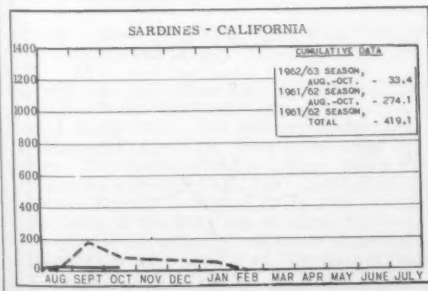
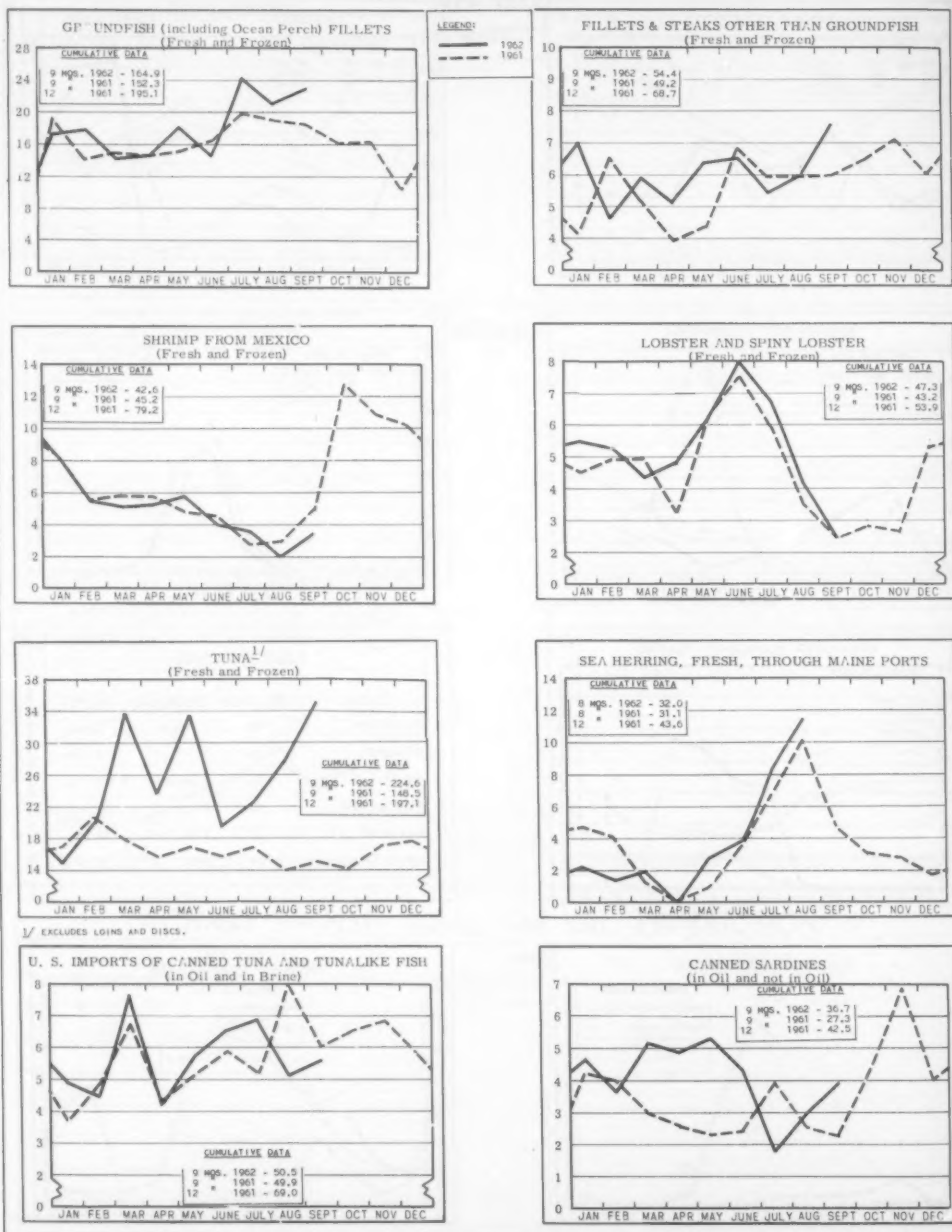
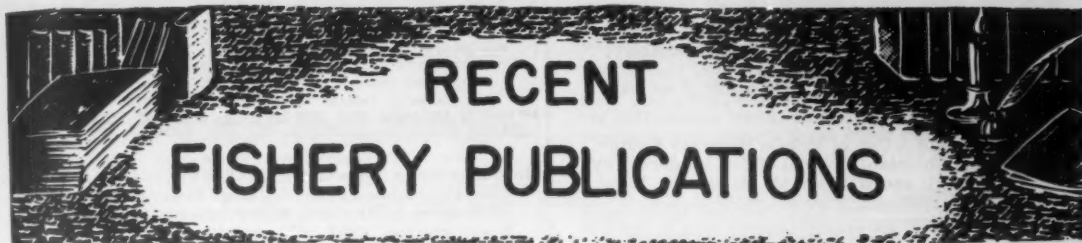


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
 FL - FISHERY LEAFLETS.
 NNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
 SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
 SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
 SSR - FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

- | Number | Title |
|----------|---|
| CFS-2977 | - Massachusetts Landings, May 1962, 5 pp. |
| CFS-2980 | - Frozen Fish Report, August 1962, 8 pp. |
| CFS-2986 | - Fish Meal and Oil, July 1962, 2 pp. |
| CFS-2987 | - Middle Atlantic Fisheries, 1961 Annual Summary, 7 pp. |
| CFS-2989 | - New York Landings, July 1962, 4 pp. |
| CFS-2991 | - Maine Landings, July 1962, 4 pp. |
| CFS-2992 | - Wisconsin Landings, July 1962, 2 pp. |
| CFS-2995 | - Ohio Landings, July 1962, 2 pp. |
| CFS-2997 | - Mississippi Landings, July 1962, 3 pp. |
| CFS-2998 | - Virginia Landings, July 1962, 3 pp. |
| CFS-3001 | - Alabama Landings, June 1962, 3 pp. |
| CFS-3002 | - Alabama Landings, July 1962, 3 pp. |
| CFS-3003 | - Michigan Landings, June 1962, 3 pp. |
| CFS-3004 | - Louisiana Landings, April 1962, 2 pp. |
| CFS-3007 | - Maryland Landings, August 1962, 3 pp. |
| CFS-3008 | - North Carolina Landings, August 1962, 3 pp. |
| CFS-3009 | - South Carolina Landings, August 1962, 2 pp. |
| CFS-3011 | - Georgia Landings, August 1962, 2 pp. |
| CFS-3012 | - New Jersey Landings, July 1962, 3 pp. |
| CFS-3014 | - Wisconsin Landings, August 1962, 2 pp. |
| CFS-3015 | - Fish Meal and Oil, August 1962, 2 pp. |

FL-176 - Atlantic Salmon (*Salmo salar*), 3 pp., June 1962 (Revised).

FL-448 - Some Publications on Fish Culture and Related Subjects, 13 pp., June 1962 (Revised).

FL-537 - A List of the Fishery Bulletins of the United States Fish and Wildlife Service, by L. T. Dees, 16 pp., April 1962. The Fishery Bulletins are technical reports of scientific investigations of fishery biology. The Bulletin of the United States Fish Commission was begun in 1881. It became the Bulletin of the Bureau of Fisheries in 1904 and the Fishery Bulletin of the Fish and Wildlife Service in 1941. Paging is serially by volumes. Through volume 46, separates were issued as Documents, each with a

Document number. Beginning with volume 47, each separate was issued as a numbered Bulletin. Fishery Bulletins are distributed to depository libraries and are sold by the Superintendent of Documents, Washington 25, D. C.

FL-540 - List of Fishery Leaflets of the U. S. Fish and Wildlife Service, by Lola T. Dees, 37 pp., May 1962. Fishery Leaflets are correspondence aids giving information on fishes and fisheries. In this report the latest issue or revision of each leaflet is listed, without reference to the original issue. Available fishery leaflets may be obtained without charge from the U. S. Fish and Wildlife Service.

Sep. No. 659 - Progress Report on Midwater Trawling Studies Carried Out Off the New England Coast in 1961 by M/V Delaware.

Sep. No. 660 - The Stockfish and Spiny Lobster Fisheries of South Africa.

Firms Canning, 1961 (Revised):

- SL-101 - Salmon, 3 pp.
 SL-111 - Clam Products, 2 pp.
 SL-112 - Shrimp, 2 pp.
 SL-113 - Crab Meat, 2 pp.

SSR-Fish. No. 397 - Winter Water Temperatures and an Annotated List of Fishes--Nantucket Shoals to Cape Hatteras, Albatross III Cruise No. 126, by Robert L. Edwards, Robert Livingstone, Jr., and Paul E. Hamer, 34 pp., illus., September 1962.

SSR-Fish. No. 399 - Some Effects of DDT on the Guppy and the Brown Trout, by Susan Frances King, 24 pp., illus., processed, March 1962.

SSR-Fish. No. 412 - Distribution of Fish Eggs and Larvae, Temperature, and Salinity in the Georges Bank-Gulf of Maine Area, 1956, by Robert R. Marak and others, 98 pp., illus., March 1962.

SSR-Fish. No. 415 - Pacific Tuna Biology Conference (August 14-19, 1961, Honolulu, Hawaii), edited by John C. Marr, 50 pp., processed, May 1962. A report of the work and results of the Pacific Tuna Biology Conference, held at the University of Hawaii in August 1961 under the auspices of the Bureau of Commercial Fisheries Biological Laboratory, Honolulu, and attended by tuna research workers and fishery experts from 11 countries. The report comprises a general account of the proceedings of the Conference; summaries of the discussions in 6 general sessions on distribution, migrations, subpopulations, behavior, tuna oceanography, and tax-

onomy and nomenclature; the reports of 2 special working groups, on identification of larval and juvenile tunas and on taxonomy and nomenclature; resolutions adopted by the Conference; abstracts of the 50 papers presented; and a list of the participants.

SSR-Fish. No. 418 - Use of Mobile Bioassay Equipment in the Chemical Control of Sea Lamprey, by John H. Howell and Willman M. Marquette, 13 pp., illus., April 1962.

SSR-Fish. No. 419 - Annual Fish Passage Report - Rock Island Dam, Columbia River, Washington, 1960, by Paul D. Zimmer and Clifton C. Davidson, 25 pp., illus., April 1962.

Common Parasites of Fishes, by Glenn L. Hoffman and Carl J. Sindermann, Circular 144, 19 pp., illus., 1962.

Monthly Mean Charts, Sea Surface Temperature, North Pacific Ocean, Circular 134, 41 pp., illus., printed, April 1962, limited distribution. The historical charts of monthly sea surface temperature in the North Pacific Ocean for 1956 and 1957 contain mean temperature data and isotherms. Also included are 12 charts showing the temperature change from each month in 1956 to the corresponding month in 1957. According to the report, the 1956-1957 period was selected for initial treatment because of widespread scientific interest in the warming which began in 1957 along the eastern boundaries of the North Pacific Ocean.

Something About--Fish, Wildlife--and You, 2 pp., illus., processed, 1962. A leaflet, intended for Girl Scouts, which discusses the importance of conservation of our fish and wildlife resources. Emphasizes the responsibility of every citizen in furthering the conservation cause. Describes the role of the Fish and Wildlife Service's National Wildlife Refuges, National Fish Hatcheries, research laboratories, exploratory fishing and research vessels, and other facilities in conservation.

Something About--the Sea, 2 pp., illus., processed, 1962. A leaflet describing the sea, its resources, typography, and movements. Discusses the food chain, peaks and valleys in the oceans' floors, ocean currents, erosion of the coastlines by the seas, and the upwellings of water from the oceans' depths.

THE FOLLOWING MARKET NEWS LEAFLET IS AVAILABLE FROM THE FISHERY MARKET NEWS SERVICE, U. S. FISH AND WILDLIFE SERVICE, SUITE 511, 777 14TH ST. NW., WASHINGTON 2, D. C.

Number	Title
MNL-17	- Italian Fishing Industry, 1960-61, 8 pp.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE BIOLOGICAL LABORATORY, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, BOOTH-BAY HARBOR, MAINE.

Preliminary Results of the "Forfangst" and Fat-Herring Investigations in Summer of 1954, by Olaf Dragesund, 11 pp., processed, 1957. (Translated from Fiskets Gang, vol. 41, no. 23, June 1955, pp. 317-322.)

The Recruitment of the Herring Stocks and the Growth of the Spring and Autumn Herring in the Western

Baltic, by Rudolph Kandler, 16 pp., illus., processed, 1957. (Translated from the German, Monatshefte fur Fischerei, vol. 10, no. 2, pp. 17-22)

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE ONLY FROM THE U. S. BUREAU OF COMMERCIAL FISHERIES BIOLOGICAL LABORATORY, BOX 3830, HONOLULU, HAWAII.

Gorbusha (Pink Salmon) - ONCORHYNCHUS GORBUS-CHA (Walbaum), by L. S. Berg, English Translations of Fishery Literature, Miscellaneous Series No. 365, 5 pp., printed, 1956. (Translated from the Russian, Promyslovye Ryby SSSR, 1949, pp. 154-156.)

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE ONLY FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, BIOLOGICAL LABORATORY, SEATTLE, WASHINGTON.

Saika (Polar Cod), BOREOGADUS SAIDA (Lepechin), by L. S. Berg and others, 7 pp., printed, 1957. (Translated from the Russian, Promyslovye Ryby SSSR, 1949, pp. 519-521.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Annual Report of Sealing Operations, 1962, Pribilof Islands, Alaska, 17 pp., processed, October 1, 1962. (Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, 6116 Arcade Bldg., Seattle 1, Wash.) Discusses kill of commercial bachelor seals, age composition, regular or bachelor season, kill of female seals, mortality among young-of-the-year, expectations for 1963, labor imported for seal killing and skin curing, and materials used in curing. Also discusses rejection of seals from killing drive, byproducts, remuneration of employees, details of daily kills, and time spent on sealing operations. Including statistical tables showing distribution of sealskins, counts of bull seals, blubber reserved for sealskin processing, ages of male seals comprising kill, abstracts of seals killed on St. Paul and St. George Islands, and time report of sealing operation.

(Baltimore) Monthly Summary--Fishery Products, August 1962, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 103 S. Gay St., Baltimore 2, Md.) Receipts of fresh- and salt-water fish and shellfish at Baltimore by species and by states and provinces; total receipts by species and comparisons with previous periods; and wholesale prices for fresh fishery products on the Baltimore market; for the month indicated.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, August 1962, 17 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; Oregon and Washington receipts (domestic and imports) of fresh and frozen tuna and tunalike fish; for the month indicated.

(Chicago) Monthly Summary of Chicago's Wholesale Market Fresh and Frozen Fishery Products Receipts, Prices, and Trends, July, August, September 1962, 13 pp. ea. (Market News Service, U. S. Fish and

Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and weekly wholesale prices for fresh and frozen fishery products; for the months indicated.

Fish Protein Concentrate, Lifeline of the Future, 6 pp., illus., printed, September 1962. (Branch of Technology, U. S. Bureau of Commercial Fisheries, Washington 25, D. C.) Fish protein concentrate (FPC) is the name for a group of possible products from dehydrated and defatted fish. It may be rendered tasteless, odorless, and colorless and the final product can range from a fine powder to one of granular consistency. It is an excellent source of high quality protein. This leaflet discusses the role of fish protein concentrate in the complete utilization of the fishery resource, hunger as the biggest human problem of the century, doubling of the world population in the next 40 years, and the inability of land food resources to supply needs. It also discusses the sea as the key to an immediate solution, the immense potential of fish protein concentrate, some notable efforts at FPC manufacture, and the need for a more vigorous research and development program.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, September 1962, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; fishery imports at Port Isabel and Brownsville, Texas, from Mexico; and sponge sales; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September 1962, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--June, July 1962, 18 pp. ea. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the months indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, September 1962, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle 4, Wash.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the

International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

Status of Fish Tagging and Tagging Techniques, U. S. Dept. of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries, Woods Hole, Massachusetts, for the Period 1957 through 1961, by S. Cogswell, Woods Hole Laboratory Report No. 62-2, 23 pp., printed, 1962. (U. S. Bureau of Commercial Fisheries, Biological Laboratory, Woods Hole, Mass.)

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON 25, D. C.

Chronic Effects of Endrin on Bluntnose Minnows and Guppies, by Donald Irvin Mount, Research Report 58, 42 pp., illus., 35 cents, 1962.

"A Comparative Study of the Blood of Wild and Hatchery-Reared Lake Trout," by Robert G. Piper and Robert F. Stephens, article, *Progressive Fish-Culturist*, vol. 24, no. 2, 1962, pp. 81-84, processed, 25 cents.

"Experimental Heating of Pond Water to Start Rainbow Trout Fry on a Dry Diet," by Kenneth E. Morton, article, *Progressive Fish-Culturist*, vol. 24, no. 2, 1962, pp. 94-96, processed, 25 cents.

Federal Aid in Fish Restoration, Regulatory Announcement 65, 22 pp., printed, 15 cents, 1962.

Federal Aid in Wildlife Restoration, Regulatory Announcement 64, 21 pp., printed, 15 cents, 1962.

"Growth Rate of Brook Trout at Different Population Densities in a Small Infertile Stream," by Edwin L. Cooper, Joseph A. Bocardy, and John K. Andersen, article, *Progressive Fish-Culturist*, vol. 24, no. 2, 1962, pp. 74-80, processed, 25 cents.

"The Indispensable Amino Acids for Rainbow Trout," by Warren E. Shanks, George D. Gahimer, and John E. Halver, article, *Progressive Fish-Culturist*, vol. 24, no. 2, pp. 68-73, processed, 25 cents.

"A Method for Force-Feeding Radioisotopes to Yearling Trout," by R. E. Nakatani, article, *Progressive Fish-Culturist*, vol. 24, no. 2, 1962, pp. 56-59, processed, 25 cents.

Predicting Year-Class Abundance of Yellowstone Lake Cutthroat Trout, by Ross V. Bulkeley and Norman G. Benson, Research Report 59, 25 pp., illus., 25 cents, 1962.

Sexual Maturity and Spawning of the Albacore in the Central South Pacific Ocean, by Tamio Otsu and Richard J. Hansen, *Fishery Bulletin* 204 (from *Fishery Bulletin of the Fish and Wildlife Service*, vol. 62), 11 pp., illus., printed, 15 cents, 1962.

"Some Observations of the Feeding Habits of Brown Trout," by F. Phillip Sharpe, article, *Progressive*

Fish Culturist, vol. 24, no. 2, 1962, pp. 60-64, processed, 25 cents.

"Supplemental Feeding of Fingerling Channel Catfish," by Otto W. Tiemeier, article, Progressive Fish-Culturist, vol. 24, no. 2, 1962, pp. 88-90, processed, 25 cents.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATIONS OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ABALONE:

"Muscle Extract of Aquatic Animals. IV--Distribution of Nitrogenous Constituents in the Muscle Extracts of an Abalone, Haliotis gigantea Discus Reeve," by Shoji Konoou and Yasuhiko Maeda, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 27, March 1961, pp. 251-254, printed. Japanese Society of Scientific Fisheries, 6-chome, Shiba-Kaigandori, Minato-Ku, Tokyo, Japan.

AFGHANISTAN:

Import Tariff System of Afghanistan, WTIS Part 2, Operations Report No. 62-47, 2 pp., printed, 15 cents. Bureau of International Programs, U. S. Department of Commerce, Washington, D. C., September 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses units of currency, weights and measures; bases of specific and ad valorem duties; method of payment of duty; customs surtaxes; sales and other internal taxes; preferential duties; consular documents and fees; trade restrictions; and other information.

ALASKA:

Kitoi Bay Research Station, Its Development, Accomplishments and Future, by Howard D. Taft, Informational Leaflet No. 9, 6 pp., processed. Division of Biological Research, Alaska Department of Fish and Game, Juneau, Alaska, February 23, 1962. Discusses the purpose and facilities of the Laboratory; current research activities--lake rehabilitation studies, pink salmon studies, and predator studies; and future plans.

ALGAE:

"An Approach to Sea Farming," by Alan D. Ansell, article, Fisheries Newsletter, vol. 21, no. 9, September 1962, pp. 17-18, 26, illus., printed. Commonwealth Office of Fisheries, Department of Primary Industry, Canberra, Australia. A progress report on experiments, using flue gas from a power station and fertilizers, to promote the growth of marine algae, for direct use or for feeding to shellfish. According to the author, "It is possible that combined algal and shellfish culture will present an efficient method of intensive cultivation of small areas of sea water. Clams, or other shellfish, reared under controlled conditions, planted on prepared grounds, protected from enemies and receiving food supplements, would be the main product.

Growth of these shellfish might be further accelerated in some areas by irrigation of the beds with the warm water effluents from industrial cooling systems."

Bibliographic Data Useful in the Study of Marine Algae, by Harold Judson Humm, Special Scientific Report No. 29, 12 pp., printed. Virginia Institute of Marine Science, Gloucester Point, Va., 1962.

Contribution to the Study of the Marine Algae of Ceylon, by M. Durairatnam, Bulletin No. 10, 181 pp., illus., printed, Department of Fisheries, Fisheries Research Station, Colombo, Ceylon, 1961.

Key to the Genera of Marine Bluegreen Algae of Southeastern North America, by Harold Judson Humm, Special Scientific Report No. 28, 6 pp., printed. Virginia Institute of Marine Sciences, Gloucester Point, Va., 1962.

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"La lyophilisation peut rapidement modifier le marche francais de la conserve et peut-etre aussi celui du frais!" (Freeze-Drying May Rapidly Affect the French Canned Fish Market and Perhaps Also that for Fresh Fish!), article *France Pêche*, vol. 7, no. 64, July-August 1962, pp. 39-40, illus., printed in French. *France Pêche*, Service Abonnement, Boite Postale 179, Lorient (Morbihan), France.

FREEZER VESSELS:

"Pesqueros Congeladores en la Flota Espanola" (Freezer Vessels in the Spanish Fleet), by R. D.

Cullun, article, *Industrias Pesqueras*, vol. 36, nos. 841-842, May 15, 1962, pp. 150-151, illus., printed in Spanish, *Industrias Pesqueras*, 21/2 Policarop Sanz, Vigo, Spain.

FREEZING:

"C'est grace aux filets de poisson que le consommateur francais apprend a connaitre les produits surgelés" (Acceptance by the French Consumer of Quick-Frozen Products is Promising for Fish Fillets), by M. Bachmann, article, *France Pêche*, vol. 7, no. 64, July-August 1962, pp. 49-51, illus., printed in French. *France Pêche*, Service Abonnement, Boite Postale 179, Lorient (Morbihan), France.

"La congelation du poisson a Saint-Pierre et Miquelon. II--Les projets d'avenir" (Fish Freezing in St. Pierre and Miquelon. II--Future Projects), article, *La Pêche Maritime*, vol. 41, no. 1013, August 1962, pp. 571-578, illus., printed in French. *La Pêche Maritime*, 190, Boulevard Haussmann, Paris, France.

"Freezing Fish in Russia," article, *Quick Frozen Foods*, vol. 22, no. 6, 1960, pp. 83-86, illus., printed. *Quick Frozen Foods*, E. W. Williams Publications, Inc., 82 Wall St., New York 5, N. Y.

"Quick-Freezing in France," by M. Anquez, article, *Revue Generale du Froid*, vol. 39, no. 1, January 1962, pp. 17-22, printed in French. Association Nationale des Ingenieurs et Techniciens du Froid et des Industries Connexes, 129 Blvd. St. Germain, Paris VI, France. Discusses the early development of quick-freezing of foods, particularly fish. Covers the present situation in the industry, including production capacity of food freezers in France, national production in 1960, cold-storage capacity, long-distance transport and retail delivery of frozen foods. Reasons for relatively low development of frozen products, and efforts by various organizations to promote the industry are also covered.

FRESH-WATER FISH:

"Flavor and Aroma of Fish Taken from Four Fresh-Water Sources," by Ruth E. Baldwin, Dorothy H. Strong, and James H. Torrie, article, *Transactions of the American Fisheries Society*, vol. 90, no. 2, 1961, pp. 175-180, printed. *American Fisheries Society*, 233 Broadway, New York, N. Y.

"Underwater Competition," by Phil Dotson, article, *Utah Fish and Game*, vol. 18, no. 9, September 1962, pp. 6-7, illus., printed, single copy 25 cents. Utah State Department of Fish and Game, 1596 W. North Temple, Salt Lake City 16, Utah. Describes briefly the game fish's struggle for survival, and the role of the fishery biologist in properly managing fisheries resources. The author states that "To manage fishery resources effectively fisheries biologists must understand how fish compete with each other for available food, and how they must compete for spawning areas, space, oxygen, cover, and other vital requirements."

FROZEN FOODS:

Frozen Foods in Food Service Establishments, by Kirby M. Hayes and others, *Food Management Program Leaflet* 2, 23 pp., illus., printed. Cooperative Extension Service, College of Agriculture, University

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of Massachusetts, 408 Atlantic Ave., Boston 10, Mass. According to the authors, "Frozen foods are increasingly important in modern food service establishments. Larger supplies, continuing research, and greater availability of many types of frozen foods make possible regular and expanding menu uses. The use of frozen foods in restaurants, hotels, and other eating places has brought changes in food preparation and cooking methods. These have come as food service operators capitalize on advantages offered by frozen foods, while at the same time adopting procedures to minimize the disadvantages. Effective use of frozen foods requires a good knowledge of these advantages and disadvantages. It also requires the use of appropriate ordering, handling, storing, preparation, and cooking procedures. It is the purpose of this leaflet to suggest ways in which food service operators can use frozen foods to best advantage." Includes information on thawing and cooking of frozen fish and shellfish, how temperatures affect them, and their storage life at 0° F.

GEAR:

"Les engins de peche--les palangres" (Fishing Gear--Long-Lines), by A. Percier, article, *France Peche*, vol. 7, no. 64, July-August 1962, pp. 75-76, illus., printed in French. France Peche, Service Abonnement, Boite Postale 179, Lorient (Morbihan), France.

"Novyi tip probleskovogo fonara dlia oboznachenii promyslovnykh buiev" (New Type of Flashing Lamp for Marking Fishing Buoys), by Iu. I. Bykhovskii, article, *Rybnoe Khoziaistvo*, vol. 35, no. 6, 1959, pp. 47-50, illus., printed in Russian. VNIRO, Glavniproekta, pri Gosplanie SSSR, Moscow, U.S.S.R.

"Predokhranitelnoe ustroistvo k tralu" (Protective Gear for Trawl), by L. I. Denisov, article, *Rybnoe Khoziaistvo*, vol. 35, no. 11, 1959, pp. 46-47, illus., printed in Russian. VNIRO Glavniproekta, pri Gosplanie SSSR, Moscow, U.S.S.R.

Studies of Factors Influencing Catching Potential of Salmon and Trout Fishing Gear, by Marian Szatybelko, OTS 60-21364, 30 pp., illus., processed, 50 cents. (Translated from the Polish, *Prace Morskiego Instytutu Rybackiego w Gdyni*, no. 9, 1957, pp. 565-596.) Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., 1961.

"Use of Gill-Net Rollers in Fishery Investigations," by Gordon F. Hartman, article, *Transactions of the American Fisheries Society*, vol. 91, no. 2, 1962, pp. 224-225, printed. American Fisheries Society, 233 Broadway, New York, N. Y.

GENERAL:

Some Fishes that Survive Extreme Injuries, and Some Aspects of Tenacity of Life, by Gordon Gunter and J. W. Ward, 7 pp., illus., printed. (Reprinted from *Copeia*, no. 4, December 19, 1961, pp. 456-462.) American Society of Ichthyologists and Herpetologists, 18111 Nordhoff St., Northridge, Calif.

GENERAL AGREEMENT ON TARIFFS AND TRADE: GATT Programme for Expansion of International Trade, Trade in Agricultural Products, Second and

Third Reports of Committee II, GATT/1962-2, 50 pp., printed, \$1. The Contracting Parties to the General Agreement on Tariffs and Trade, Geneva, Switzerland, 1962. (For sale by the International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.)

GERMAN FEDERAL REPUBLIC:

Patent Licensing Agreements with Firms in the Federal Republic of Germany and West Berlin, WTIS Part 2, Operations Report No. 62-39, 4 pp., printed, 10 cents. Bureau of International Programs, U. S. Department of Commerce, Washington, D. C., August 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses use of patents for direct investment, utilization of patent rights, taxation, and important considerations to be covered in a licensing contract.

GREAT LAKES:

"El Arrastrero de los Grandes Lagos" (The Trawl Fishery in the Great Lakes), article, *Pesca y Marina*, vol. 14, no. 4, August-September 1962, pp. 18-20, illus., printed in Spanish. Pesca y Marina, Fernando Flores Ltd., 705 N. Windsor Blvd., Los Angeles 38, Calif.

GROWTH OF FISH:

"O Kharakteristike Rosta Ryb" (Characteristics of Fish Growth), by V. L. Bryuzgin, article, *Voprosy Ikhtiologii*, vol. 15, 1960, pp. 77-90, printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaiia Komissaiia, Moscow, U.S.S.R.

GULF OF MEXICO:

Gulf Research Reports, vol. 1, no. 3, July 1962, 27 pp., illus., printed. Gulf Coast Research Laboratory, Ocean Springs, Miss. A journal devoted primarily to publication of data of the marine sciences, chiefly of the Gulf of Mexico and adjacent waters. Includes these articles: "Specific Names of the Atlantic American White Shrimp," by Gordon Gunter; "On the Names of *Penaeus setiferus* (L) and *Penaeus schmitti* Burkenroad," by L. B. Holthuis; "Reply to Dr. L. B. Holthuis on the Names of White Shrimp," by Gordon Gunter; "Studies on the Larval Development of *Rithropanopeus harrisi* (Gould) of the Family Xanthidae (Brachyura)," by M. Roy Hood.

HERRING:

"Bemerkungen zum gegenwartigen Zustand des atlanto-skandinavischen Heringsbestandes" (Remarks on the Present Status of the Atlantic-Scandinavian Herring Stock), by S. Holzlohner, article, *Fischerei-Forschung*, vol. 5, no. 2, March-April 1962, pp. 6-11, illus., printed in German. Institut fur Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, Germany.

Daily Migration of Herring Shoals and Their Reaction to Fishing Gear, by Stanislaw Okonski and Hubert Konkol, OTS 60-21306, 14 pp., illus., processed, 50 cents. (Translated from the Polish, *Prace Morskiego Instytutu Rybackiego w Gdyni*, no. 9, 1957, pp. 549-563.) Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., 1961.

"Destruction of the Reproductive Organs of Herring Caused by Ultrasound under Natural Conditions,"

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

by A. I. Rumyantsev, article, *Doklady*, vol. 134, no. 4, 1960, pp. 955-958, printed in Russian. *Doklady Akademii Nauk SSR*, Podmosenski Per. 21, Moscow B-64, U.S.S.R.

Effect of Salinity on the Sperm, Eggs, and Larvae of the Okhotsk Herring, by L. A. Galkina, OTS 61-31037, 15 pp., illus., processed, 50 cents. (Translated from the Russian, *Izvestiya Tikhookeanskogo nauchno-issledovatel'skogo instituta rybnogo khozyaistva i okeanografii*, vol. 45, 1957, pp. 37-50.) Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., 1962.

Experiments in the Incubation of Baltic Herring Eggs, by M. M. Toom, OTS 61-31040, 13 pp., illus., processed, 50 cents. (Translated from the Russian, *Trudy Vsesoyuznogo nauchno-issledovatel'skogo instituta morskogo rybnogo khozyaistva i okeanografii*, vol. 34, 1958, pp. 19-29.) Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., 1962.

"Results of Scottish Herring Fisheries in 1961 and Prospects for 1962," by B. B. Parrish, A. Saville, and I. G. Baxter, article, *Scottish Fisheries Bulletin*, no. 17, June 1962, pp. 3-12, illus., printed. Marine Laboratory, Department of Agriculture and Fisheries for Scotland, P. O. Box No. 101, Victoria Rd., Aberdeen, Scotland.

"Smasildundersokelsene i Nord-Norge 1961/62" (Investigation of Small Herring in Northern Norway in 1961/62), by T. Hognestad, article, *Fiskets Gang*, vol. 48, no. 32, August 9, 1962, pp. 453-457, illus., printed in Norwegian. Fiskets Gang. Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

"Swimming Speed of River Herring *Pomolobus pseudoharengus* (Wilson)," by Robert L. Dow, article, *Journal du Conseil*, vol. 27, no. 1, 1962, pp. 77-80, printed. Conseil Permanent International pour l'Exploration de la Mer, Charlottenlund-Slot, Denmark.

HYBRIDIZATION:

Experimental Hybridization Among Three Coregonine Fishes, by E. T. Garside and W. J. Christie, 5 pp., printed. (Reprinted from *Transactions of the American Fisheries Society*, vol. 91, no. 2, April 1962, pp. 196-200.) American Fisheries Society, 233 Broadway, New York, N. Y.

HYDROGRAPHY:

Hydrographic Data from the Atlantic Plankton Cruises of the R/V PATHFINDER, December 1959-December 1960, by Edwin Bibb Joseph and William H. Massmann, Special Scientific Report No. 18, 3 pp., illus., printed. Virginia Fisheries Laboratory, Gloucester Point, Va., 1961.

New Ways of Measuring Salinity and Temperature of Sea Water, by H. Wattenberg and J. Joseph, *Trans.* 34, 12 pp., printed. (Translated from the German, *Annalen der Hydrographie und Maritimen Meteorologie*, 1943, pp. 240-245.) U. S. Navy Hydrographic Office, Washington 25, D. C.

Surface Water Temperature and Salinity, Pacific Coast North and South America and Pacific Ocean

Islands, C&GS Publication 31-3 (First Edition), 73 pp., illus., processed, 45 cents. Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C., 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Summaries of sea water temperatures and salinities are based on observations made in Pacific harbor and coastal waters through the year 1960. Presents monthly and annual means and extremes of the surface water temperatures and salinities for each year of observation after 1954. Earlier observations are combined in 5-year groups. Also includes an index map of Pacific Ocean stations, a list of stations, a table for conversion of Fahrenheit to centigrade, and mean temperature and salinity curves.

ICE MACHINE:

"Ice Maker for Trawlers," by P. F. Konoplev, H. A. Abdul'manov, and V. P. Nekrasov, article, *Rybnoe Khozyaistvo*, vol. 36, January 1960, pp. 66-69, printed in Russian. Rybnoe Khozyaistvo, VNIRO Glavniproekta, pri Gosplanie SSSR, Moscow, U.S.S.R.

INDUSTRIAL MANAGEMENT:

A New Look at Export Markets, by Hani J. Korkegi and Laurence P. Dowd, Management Aid No. 144, 4 pp., processed. Small Business Administration, Washington 25, D. C., September 1962. Small businessmen in increasing numbers are taking a new look at export markets. Some of them are seeing tremendous possibilities there. This leaflet is designed to help you re-examine foreign markets. It points out that facts are the key to market research, whether domestic or export. The kinds of facts are much the same for both markets. Although there are some differences in overseas markets, these differences often are not as great as they may seem. Information about specific foreign markets helps owner-managers to work around such differences. This leaflet lists sources, both Government and private, from which small businessmen can get such information.

Renovation-Expansion Checklist, Management Aids No. 143, 4 pp., processed. Small Business Administration, Washington 25, D. C., August 1962. A leaflet designed to help small businessmen who face the problem of renovating or expanding their production facilities. The first section, on weaknesses in present facilities, should help owner-managers determine what sort of renovations are needed. The next section, on what a renovation plan would involve, suggests specific improvements which owners need to consider when drawing up renovation plans. In some cases present facilities may call for an addition to the plant or other expansion.

INSECTICIDES:

"Insecticide Contamination in a Farm Pond. Part I--Origin and Duration. Part II--Biological Effects," by H. Page Nicholson and others, article, *Transactions of the American Fisheries Society*, vol. 91, no. 2, 1962, pp. 213-222, printed. American Fisheries Society, 233 Broadway, New York, N. Y.

IRAN:

Licensing and Exchange Controls--Iran, WTIS Part 2, Operations Report No. 62-42, 4 pp., printed, 10 cents.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Bureau of International Programs, U. S. Department of Commerce, Washington, D. C., August 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses Iran's import policy, including licensing and exchange controls, commercial profits tax, prohibited imports, and Iran's export controls. Also discusses United States export and import controls and similar information.

IRRADIATION PRESERVATION:

Food Irradiation, vol. 1, no. 2, October-December 1960, 27 pp., illus., processed. Interdepartmental Committee on Radiation Preservation of Food, U. S. Department of Commerce, Washington 25, D. C. Includes, among others, the following articles: "Evaluation of the Wholesomeness of Irradiated Food," by H. F. Kraybill; "Comments on the Wholesomeness of Irradiation-Processed Foods," by B. Connor Johnson; "Package Irradiation Plant in U. K.," by F. J. Ley; and "Information to be Supplied in Support of a Request for Authorisation to Possess Radioactive Substances with a View to the Treatment of Foodstuffs by Ionising Radiations, France."

Food Preservation by Irradiation, 1951-58, CTR-357, 4 pp., processed. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., May 1959. A bibliography of publications on radiation preservation of foods. Includes an explanation of how to order the reports, addresses of Department of Commerce Field Offices, and types of reports available from them.

"The Radiation Department of the Federal Research Institute for Food Preservation in Karlsruhe (Germany)," by J. Kuprianoff, article, Food Irradiation, vol. 1, no. 4, April-June 1961, pp. 7-8, illus., processed. Interdepartmental Committee on Radiation Preservation of Food, U. S. Department of Commerce, Washington 25, D. C.

ISRAEL:

Fishermen's Bulletin, vol. 4, no. 2 (32), June 1962, 32 pp., illus., printed in Hebrew with English abstracts. Sea Fisheries Research Station, P. O. B. 699, Haifa, Israel. Includes, among others, articles on: "Israel South Red Sea Expedition, 1962," by O. H. Oren; "Fisheries Investigations of the ISRSE (Part I. Thunnids)," by A. Ben-Tuvia; "Transport of Fish from the Red Sea to Eilat," by Z. Samish and A. Har-Tabor; "Hybrids of Two Species of Fishes of the Genus *Tilapia* (Cichlidae, Teleostei)," by L. Fishelson; "Fisheries in USSR," by S. Tal; and "On the Fisheries of Israel," by M. Shavit.

ITALY:

"Italian Fisheries," by Giuseppe Milone, article, Review of the Economic Conditions in Italy, vol. 16, no. 2, March 1962, pp. 130-145, illus., printed. Banco di Roma, Ufficio Studi, Casella Postale 2442, Rome A/D, Italy. Discusses the role of the fisheries in the Italian economy, necessity for increasing the total productivity of the fisheries, mechanization of the fleet and government regulation of and aid to the fisheries, and size of the fleet and production. Also discusses the excessively large difference between production and consumption prices, the setting up of fishery cooperatives, par-

ticipation of the Italian fishing fleet in the Atlantic Ocean fishery and the necessity of constructing suitable harbors for this purpose, and the necessity for increased fishery production to meet the needs of the expanding world population.

KENYA:

Report on Kenya Fisheries, 1961, 25 pp., printed, 3 s. (about 42 U. S. cents). Government Printer, Nairobi, Kenya, 1962. Reviews the work done by Kenya's Fisheries Department in inland fisheries development, Lake Victoria fisheries, a fish-culture farm, and a trout hatchery and fisheries. Discusses the fishery survey and possibilities of dried fish production at Lake Randolph. The section on sea fisheries discusses landings and value of fishery products, imports, markets, loans to fishermen, crawfish landings, catch of green turtles, and the shark fishery. Also covered are two experimental fishing surveys, oyster culture, use of fish-finding gear, gear research, netting trials, deep-sea snapper traps, drifting shark long lines, and big-game fishing. Included are statistical tables showing landings and value of fish and shellfish.

KING CRAB:

King Crab (PARALITHODES CAMTSCHATICA) Recoveries in 1962 from Alitak Bay Tagging, by Guy C. Powell, Information Leaflet No. 19, 5 pp., illus., processed. Division of Biological Research, Alaska Department of Fish and Game, Juneau, Alaska, September 28, 1962. Of the 5,976 adult male king crabs tagged in August 1961 in Alitak Bay (Alaska), 517 were recovered in July 1962. Tag recovery had been heavy during previous months as well as during July, and as a result, approximately 2,500 crabs (42 percent) had been captured since release.

Length-Width Relationships of Carapace Measurements of the King Crab (PARALITHODES CAMTSCHATICA), by Roy Rickey and William Sheridan, Information Leaflet No. 2, 6 pp., illus., processed. Division of Biological Research, Alaska Department of Fish and Game, Juneau, Alaska, October 1961. Because taking both carapace length and carapace width measurements of male king crabs requires more time than taking only the length measurement, and because width measurements are subject to greater error, a calculated width was developed and is presented. Data from male king crabs measured in Chiniak Bay, Southeastern Bering Sea, and Kachemak Bay are analyzed and compared. No significant difference was found between slopes of the carapace width-length relationship lines from the three areas. Tests also showed that the length-width relationship for Chiniak Bay data was definitely linear.

LAMPREY:

"Studies on European Lampreys," by Giuseppe S. J. Zanandrea, article, Evolution, vol. 15, no. 4, 1961, pp. 523-534, printed. Society for the Study of Evolution, American Museum of Natural History, New York 24, N. Y.

LANE SNAPPER:

Estudios Estadísticos y Biológicos sobre la Biajaiba (LUTIANUS SYNAGRIS) (Statistical and Biological Studies on the Lane Snapper--*Lutianus synagris*), by Zeida Rodríguez Pino, Nota Sobre Investigaciones No. 4, 88 pp., illus., printed in Spanish with French resume. Centro de Investigaciones Pesqueras, Playa Habana, Bauta, Cuba, April 1952.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

LARVAE:

"On the Relation between the Numbers of Eggs, the Larvae of Fishes and the Volume of Plankton Collected Simultaneously with the Larval Net," by Tetsushi Senta, article, *Japanese Journal of Ecology*, vol. 11, no. 6, 1961, pp. 221-223, printed. Ecological Society of Japan, c/o Biological Institute, Tohoku, Japan.

LOBSTERS:

"Lobster Storage Problem Solved," article, *Modern Refrigeration*, vol. 134, February 1962, p. 134, printed. Refrigeration Press Ltd., Maclaren House, 131 Great Suffolk St., London SE1, England.

"Refrigerated Storage of Lobsters," by H. J. Thomas, article, *Scottish Fisheries Bulletin*, no. 17, June 1962, pp. 16-20, illus., printed. Marine Laboratory, Department of Agriculture and Fisheries for Scotland, P. O. Box 101, Victoria Rd., Aberdeen, Scotland.

LOUISIANA:

"Distribution of Fishes in Lake Bistineau, Louisiana," by Victor W. Lambou, article, *Journal of Wildlife Management*, vol. 26, no. 2, 1962, pp. 193-203, printed. Wildlife Society, 2000 P St. NW., Washington, D. C.

NETHERLANDS ANTILLES:

Import Tariff System of the Netherlands Antilles (Aruba, Bonaire, Curacao), WTIS Part 2, Operations Report No. 62-46, 2 pp., printed, 10 cents. Bureau of International Programs, U. S. Department of Commerce, Washington, D. C., August 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses the territory included; currency, weights, and measures; bases of duties; method of payment of duty; sales and other internal taxes; exchange regulations; and trade restrictions. Also discusses the absence of requirements of customs surtaxes, preferential duties, and consular documents and fees.

NETS:

The I. C. E. S. Mesh Gauge, by C. J. W. Westhoff, J. A. Pope, and R. J. H. Beverton, 13 pp., illus., printed. Conseil Permanent International pour l'Exploration de la Mer, Charlottenlund Slot, Denmark, April 1962. The gauge described in this prospectus was developed under the auspices of the Comparative Fishing Committee of the International Council for the Exploration of the Sea. It represents, in the opinion of the Committee, a combination of the best features of the various gauges which have been developed in recent years, and it has been adopted as the standard gauge for research purposes by the Council in place of the 1959 Westhoff Gauge which was previously adopted as an interim standard.

NEW ZEALAND:

Commercial Fishing, vol. 1, no. 1, September 1962, 32 pp., illus., printed, annual subscription rate (12 copies), 36/-; Australia 47/6; U. K. and foreign 38/-; U. S. and Canada \$5.50. (Sole subscription agents: R. Hill & Son Ltd., Cnr. Crowhurst and Kent Sts., Newmarket, Auckland, New Zealand.) Commercial Fishing, Trade Publications Ltd., 47

Lewis Eady Bldg., 192 Queen St., Auckland, New Zealand. The first issue of a new periodical devoted to the New Zealand fishing industry. It states that, "In launching the journal, the publishers were influenced by two main considerations: commercial fishing is the only New Zealand primary industry which has not hitherto been served by its own publication; and secondly, all indications are that the industry is approaching a period of all-time record growth." Includes, among others, articles on: "Wholesalers and Fishermen Call for More Dynamic Approach to Industry Development," by A. R. Simm; "Latest Statistics: Last Year's Fish Catch;" "Tuna Project Could be Based on New Zealand and the Cook Islands," by Ronald Powell; "Dunedin Exporter, Back from World Tour, Reports on Overseas Markets;" "Programme for an Integrated Fishing Industry," by W. B. Sutch; "Disputes and Bad Weather Heavily Reduce 1962 Oyster Catch;" "Cutting Cables Can Be Dangerous--and Costly;" "Six Fishing Boats Being Built at Port Chalmers;" "Inflatable Liferrafts Have Saved Many Lives;" "Dorman Engines Power Fishing Craft Throughout the World;" "Facilities Being Expanded for Timaru's Growing Fleet;" "San Rosa Makes Experimental Trawl in Bay of Plenty;" "Quest, New Gisborne Tuna Boat, Will Use Long Line Method of Fishing;" and "New Charts are Important Aids to Navigation."

NIGERIA:

Establishing a Business in the Federation of Nigeria, WTIS Part 1, Economic Report No. 62-57, 8 pp., printed, 15 cents. Bureau of International Programs, U. S. Department of Commerce, Washington, D. C., July 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses the Nigerian Government's policy on private foreign investment, incentives to industrial development, foreign ownership, trade factors, and customs tariff. It also discusses types of business organization, industrial property rights, legislation, regulations affecting employment, and taxation.

NORTHERN PIKE:

The Growth and Harvest of Stocked Yearling Northern Pike, ESOX LUCIUS Linnaeus, in a Minnesota Wall-eye Lake, by Merlyn L. Wesloh and Donald E. Olson, Investigational Report 242, 9 pp., printed. Minnesota Department of Conservation, Division of Game and Fish, 301 Centennial Bldg., 658 Cedar St., St. Paul 1, Minn.

NORWAY:

Fiskeflaten 1961 (Fishing Fleet, 1961), *Arsberetning vedkommende Norges Fiskerier* (1961) No. 13, 30 pp., illus., printed in Norwegian. A.s John Griegs Boktrykkeri, Bergen, Norway, 1962.

Licensing and Exchange Controls--Norway, WTIS Part 2, Operations Report No. 62-41, 4 pp., printed, 10 cents. Bureau of International Programs, U. S. Department of Commerce, Washington, D. C., August 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses Norway's import controls including licensing and exchange controls and export controls including the free list and exchange controls. Also discusses United States controls on exports and imports from Norway and related information.

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"Melding fra Fiskeridirektoren 26/7 1962, Fiskeriverenskomsten mellom Norge og Sovjet-Samveldet" (Announcement of the Fisheries Director, July 26, 1962; Agreement on Fisheries between Norway and the Soviet Union), article, *Fiskets Gang*, vol. 48, no. 30, July 26, 1962, pp. 422-427, printed in Norwegian. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

Norges Handel, 1960, Del II (Foreign Trade of Norway, 1960, Part II), Norway's Official Statistics, Series 12, no. 73, 259 pp., printed in Norwegian with English titles. Central Bureau of Statistics of Norway, Oslo, Norway, 1962. Discusses foreign trade statistics and the balance of current account, imports and exports of foods included in foreign trade statistics, and index numbers of volume and price. Also covers imports and exports by principal commodities (including fishery products), and foreign trade by countries and by ports of entry. Presents statistical tables showing imports and exports by sections and divisions, by groups and items, and by principal countries and commodities. Commodities are classified according to the Standard International Trade Classification (SITC).

NUTRITION:

"Mathematical Theory of Nutritional Relationship of Fishes," by V. S. Ivlev, article, *Nature*, vol. 192, October 28, 1961, pp. 297-298, printed. *Nature*, St. Martin's Press, 175 5th Ave., New York 10, N. Y.

OCEANOGRAPHY:

Bottom Topography from "Crawford" Cruise Ten Obtained for the International Geophysical Year of 1957-58, by Robert Allen Lufburrow, 8 pp., illus., printed. Oceanographic Institution, Woods Hole, Mass., 1957.

Datos Oceanograficos de la Playa Habana: III (Oceanographic Data for Havana Beach. III), by Jose A. Perez Sori, Contribucion No. 16, 26 pp., illus., printed in Spanish with French resume. Centro de Investigaciones Pesqueras, Playa Habana, Bauta, Cuba, June 1962.

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Studies on the Biology of the Pink Shrimp, PENAUS

DUORARUM, Burkenroad, in *Everglades National Park, Florida*, by Durbin C. Tabb, David L. Dubrow, and Andrew E. Jones, Technical Series No. 37, 28 pp., illus., printed. Florida State Board of Conservation, W. V. Knott Bldg., Tallahassee, Fla., May 1962. The biology of pink shrimp of northern Florida Bay was studied in conjunction with other studies on the ecology of estuarine plants and animals in a natural fluctuating environment. More than 25,000 juvenile pink shrimp collected during the period September 1957 through April 1962 were examined for length and sex composition. Also studied were periods of abundance, catch-per-unit-effort, causes of shrimp mortality, growth, movement, and distribution in relation to salinity.

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SPAIN:

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"Junella--Britain's Second Freezer Stern Trawler," article, *World Fishing*, vol. 11, no. 9, September

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of Commerce, Washington, D. C., and are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 10 cents each. Charts show stations displaying small craft, gale, whole gale, and hurricane warnings, explanation of warning displays, and schedules of AM and FM radio, TV, and radiophone stations that broadcast weather forecasts and warnings.

Coastal Warning Facilities Chart, Canadian Border to Eureka, Calif., and Alaska, 1962.

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CERTAIN CANNED FISHERY PRODUCTS REQUIRE LONGER HEAT PROCESSING

"It has long been known that starchy foods have a very slow rate of heat penetration. Fishery products such as fish balls, fish pudding, and fish pastes must be processed for longer periods than fish which are canned without added starchy ingredients. For example, fish pudding will require a process averaging 5 minutes longer than mackerel or salmon solely because of starch content, even though the size of can, fill, initial temperature, and all other factors show no difference between the products.

A product packed too tightly heats much more slowly than a more loosely-packed can of the same product. This is indicated most clearly in the canning of certain vegetables, but the condition may occur in the canning of fishery products. A too heavy consistency will of itself delay the rate of heat penetration."

--"Principles and Methods in the Canning of Fishery Products," *Research Report No. 7* (page 21), U. S. Fish and Wildlife Service.

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